

FIFTY-SECOND ANNUAL REPORT
OF THE
DEPARTMENT OF MARINE
AND FISHERIES

FOR THE
FISCAL YEAR 1918-19

MARINE

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
J. de LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

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*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the Fifty-second Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE,
OTTAWA, October, 1919.

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REPORT
OF THE
Deputy Minister of Marine and Fisheries

To the Honourable C. C. BALLANTYNE,
Minister of Marine and Fisheries.

SIR,—I have the honour to submit herewith my report for the fiscal year ended March 31, 1919.

At the beginning of the last fiscal year the German submarine menace had reached its maximum, a toll of approximately 1,000,000 tons (deadweight) of allied and neutral shipping having been taken in the month of April alone; since then losses in ships due to war causes have steadily declined.

It was surmised in last year's report that the American output of ships during 1918 would in all probability be a powerful factor in the defeat of the submarine; this has now been clearly shown.

The American production of ships during 1918 has been remarkable, particularly when it is remembered that prior to her entry into the war America was not to any extent a shipbuilding nation, and had to establish yards before turning out ships; what has been achieved by her in this respect, as well as by the other allied nations, will be dealt with later on.

The submarine peril, though much lessened, was far from removed despite all contributions to new shipping.

Mr. Archibald Hurd, Naval Correspondent of the *Daily Telegraph*, gives the following figures illustrating this: during the months of April, May, and June, 1918, total shipping losses, allied and neutral, were 946,578 gross tons as compared with 2,236,934 gross tons for the same period in 1917. This average loss of approximately 1,000,000 tons to a quarter, and a trifle over 300,000 tons a month was grave enough, though the losses in the course of a year had been more than cut in half.

British losses due to enemy action and marine risk from April 1 to the end of July, 1918, were 1,312,315 gross tons; British vessels built and put afloat in the same period 763,246 tons, a decrease in British shipping during the first four months of the fiscal year 1918-19 of 549,069 gross tons.

ALLIED AND NEUTRAL MERCHANT SHIF LOSSES AND BUILDING.

From August, 1914, to the date of the signing of the armistice (November 11, 1918) the total yearly losses suffered by the allied and neutral nations are thus given by the *New York Journal of Commerce*:—

Year.	Gross tons.
1914 (five months).....	681,363
1915.....	1,724,720
1916.....	2,797,866
1917.....	6,623,623
1918.....	3,096,418
Total.....	14,923,990

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ALLIED AND NEUTRAL LOSSES FOR 1917 AND 1918.

Month.	1917.	1918.	
	Gross tons.	Gross tons.	Decrease.
January.....	409,832	357,508	52,324
February.....	574,856	387,949	186,907
March.....	634,685	401,463	233,222
April.....	893,877	318,581	575,296
May.....	630,336	364,990	265,346
June.....	712,721	279,799	432,922
July.....	575,949	324,774	251,175
August.....	549,363	328,172	221,191
September.....	369,161	239,600	129,561
October.....	487,337	93,582	393,755
November.....	333,443		
December.....	452,063		
Total.....	6,623,623	3,096,418	2,741,699

COMPARISON OF ALLIED AND NEUTRAL SHIP DELIVERIES AND LOSSES FOR 1918.

Month.	Allied and Neutral Losses.	Allied and Neutral Ship Deliveries.	Margin.
1918.	Gross Tons.	Gross Tons.	
January.....	357,508	156,764	— 200,744
February.....	387,949	243,273	— 144,676
March.....	401,463	368,997	— 32,466
April.....	318,581	291,188	— 27,393
May.....	364,990	493,469	+ 128,479
June.....	279,799	428,124	+ 148,324
July.....	324,774	398,176	+ 73,402
August.....	328,172	468,585	+ 140,413
September.....	239,600	390,992	+ 151,392
October.....	93,582	551,162	+ 457,580
Total.....	3,096,418	3,790,730	+694,312

For each of the first four months in 1918 ship losses exceeded ship building, the margin of losses, however, decreasing and especially in the month of March falling quite sharply.

From May to November in each month the building topped the losses, and in the last completed month of the war, October, by nearly half a million tons, thus indicating clearly the progressive increase of building over losses during the year.

PROPORTIONATE LOSSES IN 1918.

Month.	Britain.	United States.	Other Allies and Neutrals.
1918.	Gross Tons.	Gross Tons.	Gross Tons.
January.....	218,621	2,981	135,906
February.....	254,303	10,838	121,496
March.....	224,666	5,868	170,929
April.....	233,169	2,690	82,722
May.....	231,787	15,276	117,927
June.....	165,550	12,501	101,748
July.....	182,524	2,599	138,649
August.....	176,434	44,618	107,120
September.....	151,593	7,537	80,470
October.....	83,952	2,458	7,172
November.....		2,873	
Total.....	1,922,599	110,239	1,064,139

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It will be seen that the British losses nearly doubled those of the other allies and neutrals combined.

The proportionate yearly British and other allied and neutral losses during the war were:—

Year.	Britain.	Other Allies and Neutrals.	Total.
	Gross Tons.	Gross Tons.	Gross Tons.
1914.....	496,552	212,635	709,187
1915.....	1,103,379	621,341	1,724,720
1916.....	1,497,843	1,300,018	2,797,866
1917.....	4,009,327	2,614,086	6,625,623
1918.....	1,923,412	1,274,878	3,198,390
Total.....	9,031,828	6,021,958	15,053,786

The losses in 1918, although slightly less than half those in 1917, were still greater than the losses in any war year preceding 1917, showing that German submarine operations were a grave danger up to the end.

The British shipping loss of 9,000,000 tons comprised roughly (on the authority of Prof. W. S. Abell, Chief Surveyor of Lloyds) 2,000 vessels, 500 liners and 1,500 tramps; the toll of lives among British merchant seamen was 15,000.

The losses sustained by the different allied and neutral countries in gross tons during the war, as given by Mr. Archibald Hurd in the *Daily Telegraph* were:—

United Kingdom and Dominions.....	9,055,668
United States.....	501,038
Belgium.....	105,081
Brazil.....	31,279
Denmark.....	245,302
Holland.....	229,041
France.....	807,077
Greece.....	414,675
Italy.....	861,435
Japan.....	270,033
Norway.....	1,171,760
Spain.....	237,862
Sweden.....	264,001
Total.....	14,194,252

This total is slightly less than that given by the *New York Journal of Commerce* already quoted. The losses of the allied and neutral nations, apart from Great Britain, are put by Mr. Hurd at 5,138,584, Great Britain's losses being nearly double those of all the other given nations combined, seventeen times those of the United States, and ten times those of either France or Italy.

PROPORTIONATE BUILDING.

Year.	Britain.	Other Allies and Neutrals.	Total.
	Gross Tons.	Gross Tons.	Gross Tons.
1914.....	675,610	337,310	1,012,920
1915.....	650,919	551,081	1,202,000
1916.....	541,553	1,146,448	1,688,008
1917.....	1,163,474	1,774,312	2,938,786
1918.....	1,310,741	2,698,080	4,008,811
Total.....	4,342,298	6,507,231	10,849,525

In 1915, allied and neutral losses exceeded building by 522,720 gross tons, in 1916 by 1,109,858, in 1917 by 3,686,837, but in 1918, owing to the 1917 losses being cut in half and to increased building activity especially by America, the building surpassed the losses by 810,421 gross tons; 1914 being the only other similar war year, when the margin of safety was 303,733 gross tons.

British merchant shipping decreased during the war by 4,689,530 gross tons, that of the other allies and neutrals remaining almost stationary with a small balance of 485,273 gross tons in favour of building over losses.

The total decrease of allied and neutral shipping during the war amounted to 4,204,259 gross tons; this is serious enough but worse is behind; taking Lloyd's figures, the gross steam merchant tonnage of the allied and neutral powers in 1914 was roughly 39,000,000, at the normal yearly peace increment increase of five per cent this tonnage ought, in four years' time, to have reached an additional 8,000,000; the real shortage of shipping for these nations to meet their peace requirements is therefore 12,000,000 tons, and the demands on sea transport after the war are bound to be excessive; this situation is somewhat relieved by the confiscation of 2,392,675 gross tons of enemy vessels in neutral ports, provided, of course, that these remain confiscated.

Britain, as can readily be seen, was particularly hard hit; taking 20,000,000 as her gross tonnage in 1914 (*see* Lloyd's figures) and applying the five per cent principle, it will be found that the shortage amounts to about 9,000,000 gross tons for her ordinary needs, and her needs for a considerable period after the war will be the reverse of ordinary.

LLOYD'S RETURNS of Merchant Ships under Construction for the Quarter ended
December 31, 1918.

GREAT BRITAIN.

Description.	December 31, 1918.	
	Number.	Gross Tons.
Steam—		
Steel.....	414	1,975,962
Iron.....	2	1,240
Wood and Composite.		
Total.....	416	1,977,202
Sail—		
Steel.....	8	2,750
Iron.....		
Wood and Composite.		
Total.....	8	2,750
Total Steam and Sail.....	424	1,979,952

TONNAGE of Vessels under Construction in Great Britain.

Gross Tonnage.				Number.	
				Steam.	Sail.
*100 and under	500	tons		20	8
500	1,000	"		17	
1,000	2,000	"		34	
2,000	3,000	"		43	
3,000	4,000	"		48	
4,000	5,000	"		12	
5,000	6,000	"		149	
6,000	8,000	"		48	
8,000	10,000	"		29	
10,000	12,000	"		4	
12,000	15,000	"		6	
15,000	20,000	"		2	
20,000	25,000	"		4	
Total...				416	8

*Vessels of less than 100 tons are not included in Lloyd's Register Shipbuilding returns.

Between one-third and one-half of the total number of steamships under construction in Great Britain for the quarter ended December 31, 1918, are in the 5,000 to 6,000 gross-ton class, or, put in deadweight tons, 7,500 to 9,000.

In last year's report it was stated that the class of vessel giving the best return on outlay was one ranging between 7,000 and 10,000 tons deadweight capacity; the British programme gives practical support to this theory.

What is of peculiar interest to the Empire and to Canada in the table on page 6 is: first, the comparison between the returns for Britain and the Dominions, and those for America; and second, the position taken by Canada herself among the other nations.

Number of ships under construction in Britain and the Dominions 619, total gross tonnage 2,258,663, in the United States 997, total gross tonnage 3,645,919.

It can be readily judged what sort of a part America is likely to play in the world's sea-carrying trade, and four years ago she was almost an onlooker.

Comparing small things with great, the Canadian return is scarcely less remarkable.

Lloyd's statement includes returns from all the chief shipbuilding countries of the world with the exception of the Central Powers (for obvious reasons), in this company Canada's 1918 programme ranks third in the number of ships, 148 to Japan's 116, and fourth in tonnage 225,264 to Japan's 278,140, only 52,876 tons less; a notable showing in a short time, which augurs well for the future.

Countries.	Steamers and Motor Vessels.				Sailing Vessels.				Total.	
	Steel.		Wood.		Steel.		Wood.			
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.		
British Dominions—										
Canada—Great Lakes....	31	62,990	1	2,400					195	278,711
Coast.....	21	76,666	48	61,139			47	22,069		
Other Dominions.....	9	40,402	10	4,858			28	8,187		
China.....	6	8,968	1	850					7	9,818
Denmark.....	45	70,258	5	1,770	1	115			51	72,143
France.....	12	51,690							12	51,690
Holland.....	113	212,512							113	212,512
Italy.....	20	112,300	26	16,500			10	4,210	56	133,010
Japan.....	89	257,777	27	20,363					116	278,140
Norway.....	54	62,157	17	5,581					71	67,738
Portugal.....			2	700			34	14,420	36	15,120
Spain.....	30	76,335	1	246	1	250	3	766	35	77,597
Sweden.....	48	89,368	28	10,271					76	99,639
United States—										
Atlantic Coast.....	286	1,494,496	98	205,160	2	4,600	22	25,450		
Gulf Ports.....	10	76,810	107	272,610	1	4,500	11	10,460	997	3,645,919
Pacific Coast.....	120	706,350	218	551,140			3	3,950		
Great Lakes.....	119	290,393								
Total.....	1,013	3,689,472	589	1,153,588	5	9,465	158	89,512	1,765	4,942,037

LLOYD'S COMPARATIVE STATEMENT OF WORLD OUTPUT OF MERCHANT SHIPPING (GROSS TONS) FOR THE YEARS 1911 TO 1914 INCLUSIVE, AND 1915 TO 1918 INCLUSIVE.

This summary only includes vessels built for mercantile purposes over 100 tons burden. The Returns from Austria-Hungary and Germany for the years 1915-18 are not available.

Year.	United Kingdom.		Dominions.		Austria-Hungary.		Denmark.		France.		Germany.		Holland.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
1911.....	772	1,803,844	62	19,662	16	37,836	18	18,689	79	125,472	154	255,532	113	93,050
1912.....	712	1,738,514	84	34,790	12	38,821	22	26,103	80	110,734	165	375,317	112	99,439
1913.....	688	1,932,153	91	48,339	17	61,757	31	40,932	89	176,095	162	465,226	95	104,296
1914.....	656	1,683,553	80	47,534	11	*34,335	25	32,815	33	114,052	89	*387,192	130	118,153
Total.....	2,828	7,158,064	317	150,325	56	172,749	96	118,539	281	526,353	570	1,483,267	450	414,938
1915.....	327	650,919	31	22,014			23	45,198	6	25,402			120	113,075
1916.....	306	608,235	40	31,571			28	35,277	9	42,752			201	180,197
1917.....	286	1,162,896	105	94,471			23	20,445	6	18,828			146	148,779
1918.....	301	1,348,120	206	279,904			13	26,150	3	13,715			74	74,026
Total.....	1,220	3,770,170	382	427,960			87	127,070	24	100,697			541	516,077

Year.	Italy.		Japan.		Norway.		Sweden.		United States.		Other Countries.		World Total.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
1911.....	14	17,401	109	44,359	71	35,435	11	9,427	142	171,569	38	17,864	1,599	2,650,140
1912.....	27	25,196	168	57,755	89	50,255	22	13,968	174	284,223	52	46,654	1,719	2,901,769
1913.....	38	50,356	152	64,664	74	50,637	25	18,524	205	276,448	83	43,455	1,756	3,332,882
1914.....	47	42,981	32	85,861	61	54,204	26	15,163	91	200,762	35	*36,148	1,319	*2,852,753
Total.....	126	135,934	461	252,639	295	190,531	84	57,082	615	933,002	208	144,121	6,387	11,737,544
1915.....	30	22,132	26	49,408	59	62,070	27	20,319	84	177,460		*13,641	743	*1,201,638
1916.....	10	56,654	55	145,624	52	42,458	34	26,769	211	504,247	18	*14,296	964	*1,688,080
1917.....	11	38,906	104	350,141	44	46,103	34	26,760	326	997,919	27	*32,538	1,112	2,937,786
1918.....	15	60,791	198	489,924	51	47,723	36	39,583	929	3,033,030	40	*31,478	1,866	*5,447,444
Total.....	66	178,483	383	1,032,097	206	198,554	131	113,431	1,550	4,712,656	95	91,953	4,685	11,274,918

*Returns not complete.

The French war output is only one-fifth of that for the four previous years, Britain's about one-half, Denmark and Norway show a slight increase, Italy increased her output by one-third, Holland by one-quarter. The Swedish output for 1915-18 is about double that for 1911-14, the Dominions about treble, the Japanese fourfold, and the United States fivefold; the main building increase for these three last countries taking place in 1918. The world's total output of tonnage for 1915-18 very nearly equals that for 1911-14, the difference in favour of the latter being 462,596 tons.

DROP IN RATES.

The sharp fall in ocean freight rates came somewhat as a surprise; the lead was taken by such British lines as the Cunard, Furness-Withy, International Mercantile Marine group, and Canadian Pacific, after due notice had been given to the Director of Operations of the United States Shipping Board; this action was taken on their own initiatives, as the rates on free space are fixed by the lines themselves, and are not subject to the approval of the British Ministry of Shipping, with the single exception of the rate on cotton.

Upon the receipt of this notice the United States Shipping Board promptly followed suit by declaring a rate reduction of 66 per cent on ocean freight from American to European ports borne by its ships; these reduced rates only apply to United States Shipping Board vessels, and not to those privately owned, but as the Shipping Board operates at least half of the American Merchant Marine, the remainder is certain to be largely affected, and on routes where both are operating in common the Shipping Board's rates are certain to obtain.

Whether or not the new revision will stand for any length of time is a moot question, but in American ship-owning circles the prevailing opinion seems to be that an approximate minimum has been reached and that the present scale of rates is not likely to go lower, although it may in some cases be increased; in the cases, however, of a number of shippers and exporters whose opinions were solicited by the *New York Journal of Commerce*, the majority favoured a further and more general reduction.

The tendency will be to restore and extend export business, and to lower the prices of commodities generally; the trades chiefly affected are cotton, steel, copper, hides, textiles, lumber, and groceries and foodstuffs; the profits of merchant ships, whether under private or government control, will of course be curtailed.

The comparison between the old and new rates per measurement ton is thus given by the *New York Journal of Commerce*, the new rates going into force on February 1, 1919:—

America to United Kingdom.....	\$66 00	cut to \$20
“ French Atlantic ports.....	66 00	“ 26
“ French Mediterranean ports.....	71 50	“ 34

From the same source are taken the following United States Shipping Board rates on Webb high density cotton, present cargo space not warranting the shipment of loosely baled cotton:—

From United States Atlantic ports to—	Per 100 Pounds.	
	New.	Old.
United Kingdom main ports.....	1 25	4 50
France main Atlantic ports.....	1 50	4 75
Main Mediterranean ports.....	2 00	5 25
Holland, Rotterdam.....	1 50	4 75
Belgium, Antwerp.....	1 50	4 75
Portugal, main ports.....	1 50	4 75
Spain, Barcelona.....	2 00	5 75
Italy, main ports.....	2 25	5 50

Shipments from United States Gulf ports, 25 cents extra.

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GROWTH OF AMERICAN MERCHANT MARINE.

In August, 1917, there were in America 61 shipyards, of which 37 were steel yards, with 162 ways.

In September, 1918, there were all told 203 yards, with 1,020 ways; of these yards 77 were steel, 117 wood, 2 composite, and 7 concrete.

In 1916 the American yards employed 50,000 men; they now employ 386,000.

At the time of the entry of the United States into the war her merchant marine comprised 2,750,000 deadweight tons of seagoing ships over 1,500 tons burden; in September 1918 (not including vessels of 1,500 tons) it consisted of:—

	Number.	D.W. Tons.
Requisitioned American ships.....	449	2,900,525
Ex-German and ex-Austrian ships taken over.....	100	644,713
New ships owned by Shipping Board.....	256	1,465,963
Old lake steamers transferred.....	31	117,800
American ships not yet requisitioned (over 1,500 tons d.w.).....	377	980,459
Dutch steamers requisitioned.....	81	486,945
Foreign ships chartered to Shipping Board.....	291	1,208,411
Foreign ships chartered to American citizens.....	600	1,707,099
Total.....	2,185	9,511,915

Of this fleet, 1,294 ships, total tonnage 6,596,405, fly the American flag, 891 foreign vessels, total tonnage 2,915,510, are under charter either to the Shipping Board or to private companies.

AUSTRALIAN SHIPBUILDING.

For these tables the department is indebted to Mr. A. M. Bomphrey, Director of Ship Construction, Newcastle, N.S.W.

NUMBER and Tonnage of Ships built and registered in the Commonwealth during each of the Calendar Years 1914-17.

Year.	Number.	Tonnage Gross.
1914.....	55	3,817
1915.....	14	1,278
1916.....	7	146
1917.....	6	333
Total.....	82	5,574

Output for 1918-19.

The probable output of tonnage for this year will be about 40,000 tons as shown below:—

Number.	Type.	Locality.	Builders.
6	Steel Cargo Steamers.....	Williamstown.....	Commonwealth Ship Construc- tion Branch.
6	“ “	Walsh Island.....	New South Wales Government.
2	“ “	Cockatoo Island.....	Commonwealth Navy Depart- ment.
4	“ “	Maryborough (Q).....	Walkers, Ltd.
4	“ “	Adelaide.....	Poole and Steel.
2	“ “	Tasmania.....	Mersey Shipbuilding Company, Ltd.
6	Wood Auxiliary Schooners.....	Sydney.....	Hughes, Martin & Washington, Ltd.
6	“ “	Fremantle.....	W. A. Shipbuilding Company.
6	Wood Auxiliary Barquentines....	Sydney.....	Wallace Power Boat Company.
6	“ “	Sydney.....	Kidman and Mayoh.

The importance at present attached by Australia to the building of ships may be judged by the fact that her program for 1918-19 is seven times her total output for the four preceding years.

SHIPPING IN THE FUTURE.

Sea transport after the war will in all likelihood be chiefly controlled by Great Britain and the Dominions, the United States, Japan, and possibly the Central Powers (Germany and Austria-Hungary).

In 1914 the merchant steam tonnage of these countries, according to Lloyd's Register, was in gross tons:—

Great Britain and Dominions.....	20,523,706	
Germany.....	5,134,720	
Austria-Hungary.....	1,052,280	6,187,000
United States.....		1,813,775 (this is sea-going tonnage only, the United States had besides 3,040,973 in lake tonnage.)
Japan.....		1,078,386

The total steam tonnage of the world at that time was 45,403,877, Great Britain and the Dominions owning 40 per cent of it; post-war conditions, however, may tend to somewhat modify this position.

The recent shipbuilding activities of the United States and Japan, coupled with their comparative immunity from submarine losses, will have a very considerable effect on the shipping situation of the future.

Britain, during the entire course of the war, despite her heavy losses, has placed her merchant tonnage unreservedly at the service of the Allies; in doing so she has abandoned to a greater or lesser extent some of her former trade routes; this holds true in particular of the Pacific trade, of which she controlled 40 per cent before the war, Japan's share being about 30 per cent. British tonnage on this route has now dropped by 10 per cent, while the Japanese has doubled, but owing to the astonishing increase of American shipbuilding during the war, Japan's most formidable rival there in the future will probably be the United States.

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In 1913 the value of Britain's imports was \$3,736,050,381, of her exports \$3,085,200, 784; the adverse balance of trade of \$650,849,597 was offset in part by interest on foreign investments, but chiefly by the earnings of her merchant marine.

Britain's merchant marine is literally her life-line, and its standing after the war in relation to that of other maritime nations will be of the utmost importance.

Mercantile shipbuilding in Britain since 1914 has been heavily handicapped; there has been a shortage of steel due to the pressing demand for guns and munitions, the drain on her man power stripped her plants, and men were put into the ranks who might better have served the allied cause in the yards.

It was not until the spring of 1918 when the tonnage situation became acute that 20,000 shipwrights were released from the army. She had to consider the imperative needs of her navy, and to maintain constantly at sea an immense fleet of first-line battleships and cruisers, besides destroyers, trawlers, drifters, and all manner of anti-submarine craft.

Addressing visiting American journalists in London in October, 1918, Admiral Sims, commanding the United States fleet in European waters, said that there were then about 5,000 anti-submarine craft operating day and night in the North sea and vicinity; of this flotilla, 160 or 3 per cent were American vessels, the remainder being British; he stated that about the same proportion obtained in the Mediterranean.

This is a striking tribute to the pre-eminence of Britain's navy, and of her merchant marine as well, for no small share of the battle against German mine and submarine has been borne by the latter.

During four years of war the displacement tonnage of the navy, including auxiliaries, has increased from 2,500,000 to 6,500,000, and the personnel from 146,000 to 406,000.

British yards of late have carried on an extensive work in the repairing and refitting of merchant ships damaged by mine or torpedo, hampering greatly the output of new shipping; between June, 1917, and October, 1918, 10,000 British ships, besides a number of allied and neutral vessels, were repaired and made serviceable.

In any estimate of Britain's capacity to build merchant ships under post-war conditions, all these factors must be taken into account.

THE CENTRAL POWERS.

In considering the merchant shipping output of the Central Powers during the war period it must be borne in mind that they have been largely free from the disabilities under which Britain has laboured.

Early in the war they gave up any attempt to keep the sea, confining themselves almost entirely to the use of submarines, thereby curtailing the building of the larger battleships. The repairing and refitting operations of their merchant shipyards have been confined to their Baltic fleet, a mere trifle; they have thus been able to devote the greater part of their building activity to the production of new merchant ships, and that they have done this to a very considerable extent may be taken for granted from information that has leaked out from Germany.

On the authority of the late Herr Ballin there are at present building in German yards one ship of 56,000 gross tons, one of 35,000, two of 30,000, and a number ranging from 9,000 to 22,000 tons; Germany, as heretofore, evidently pinning her faith to the big freighters.

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The system of heavy subsidies started before the war is to be continued, especially to merchant ships completed within three years after the declaration of peace.

Of the merchant shipping of the Central Powers, 2,700,000 tons were interned in German or Austrian ports at the outbreak of war, the remaining 3,487,000 being in neutral ports; of the latter 2,392,675 tons have been confiscated; irrespective of new output the Central Powers have at present 3,794,325 gross tons of merchant shipping. As their output of shipping in 1914 was roughly 600,000 gross tons, it may be assumed that they have at present at the least between four and five million tons for post-war trade.

CANADIAN SHIPBUILDING POLICY.

Owing to the drain on merchant tonnage generally and on British tonnage in particular due to the war, the possession of ships has become of capital importance to the Dominions, first to carry their own products overseas, and second to partake in the sea-carrying trade, and obtain the advantage of the high freight rates which are likely to obtain for a considerable post-war period; it has already been shown how Australia has increased her shipbuilding activities.

The Canadian Government, recognizing how much the possession of a merchant marine, solely under Canadian control either governmental or private, will mean to the future trade prosperity of Canada, has launched an extensive plan for the building of a Canadian merchant marine in Canadian shipyards.

In this connection it may be noted that rolling mills for the output of steel plates and steel shapes for ships have now been established at Sydney, N.S.; hitherto the bulk of these plates and shapes came from American sources, but Canada is now in a position to employ Canadian firms only in all that pertains to the building of ships.

Apart from the formation of a much-needed Canadian merchant marine the Government plan has another side, the placing of the Canadian shipbuilding industry on a firm footing; nearly one-fourth of the government contracts for ships run into the year 1920; this ought to enable the Canadian yards affected to become securely established, and to compete successfully in the output of ships for foreign governments.

CANADIAN GOVERNMENT SHIPBUILDING PROGRAMME.

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No.	Firm.	Deadweight Tonnage.	Type.	Date of Delivery.	Sea Speed. Knots.
1	Canadian Vickers, Ltd	4,300	Single deck—Poop, bridge and forecastle	December 21, 1918.	11
2	"	8,100	Two deck—Poop, bridge and forecastle.	January 15, 1919.	11
3	Collingwood Shipbuilding Co.	3,750 Lake type	Single deck—Poop, bridge and forecastle	May 1, 1919.	9
4	Wallace Shipyards, Ltd.	4,300	"	March 31, 1919.	11
5	"	4,300	"	May 31, 1919.	11
6	"	5,100	"	July 31, 1919.	11
7	"	5,100	"	September 30, 1919.	11
10	Collingwood Shipbuilding Co.	3,750 Lake type	"	May 15, 1919.	9
11	"	3,750 Lake type	"	June 15, 1919.	9
12	"	3,750 Lake type	"	July 1, 1919.	9
13	Tidewater Shipbuilders, Ltd	5,100	"	August 1, 1919.	11
14	Tidewater Shipbuilders, Ltd	5,100	"	September 1, 1919.	11
15	"	5,100	"	May 1, 1920.	11
16	"	5,100	"	July 1, 1920.	11
17	Davie Shipbuilding and Repairing Co	5,100	"	November 1, 1919.	11
18	"	5,100	"	November 8, 1919.	11
19	Port Arthur Shipbuilding Co	3,400 Lake type	"	June 1, 1919.	9
19a	"	3,400 Lake type.	"	September 30, 1919.	9
20	"	3,400 Lake type.	"	July 1, 1919.	9
20a	"	3,400 Lake type	"	October 31, 1919.	9
21	Halifax Shipbuilders, Ltd	8,100	Two Deck—Poop, Bridge and Forecastle	December, 1919	10
22	"	8,100	"	April, 1920.	10
23	Canadian Vickers, Ltd	4,300	Single Deck—Poop, Bridge and Forecastle	May 27, 1919	11
24	"	8,100	Two Deck—Poop, Bridge and Forecastle	May 1, 1919.	11
25	"	8,100	"	June 1, 1919.	11
26	"	8,100	"	July 1, 1919.	11
27	"	8,100	"	August 1, 1919.	11
28	"	8,100	"	September 1, 1919.	11
29	Victoria Machinery Depot Co.	8,100	"	January 31, 1920.	11
30	"	8,100	"	March 31, 1920.	11
31	Kingston Shipbuilding Co.	3,750	Single Deck—Poop, Bridge and Forecastle	November 1, 1919.	9

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CANADIAN GOVERNMENT SHIPBUILDING PROGRAMME—concluded.

No.	Firm.	Deadweight Tonnage.	Type.	Date of Delivery.	Sea Speed.
		Lake type			Knots.
32	Port Arthur Shipbuilding Co.	4,350	Single Deck—Poop, Bridge and Forecastle	November 1, 1919...	10½
33	"	4,350	"	November 15, 1919..	10½
34	J. Coughlan & Sons.	8,100	Two Deck—Poop, Bridge and Forecastle	July 31, 1919.....	11
35	"	8,100	"	August 31, 1919.....	11
36	"	8,100	"	September 30, 1919....	11
37	"	8,100	"	October 31, 1919.....	11
38	Halifax Shipbuilders, Ltd.	10,500	Three Deck—Poop, Bridge and Forecastle	August 1, 1920.....	12
39	"	10,500	"	November 1, 1920.....	12
40	Nova Scotia Steel and Coal Co	2,800	Single Deck—Poop, Bridge and Forecastle	October, 1919.....	8½
41	"	2,800	"	November, 1919.....	8½
42	John L. Mullen Construction Co., Prince Rupert, B.C.	8,100	Two Deck—Poop, Bridge and Forecastle	February, 1920.....	11
43	John L. Mullen Construction Co., Prince Rupert, B.C.	8,1000	"	June, 1920.....	11
44	British American Shipbuilding Co	4,350	Single Deck—Poop, Bridge and Forecastle	November, 1919.....	10½
45	"	4,350	"	June, 1920.....	10½

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OPERATIONS OF CHIEF CANADIAN SHIPBUILDING PLANTS.

Nova Scotia Steel and Coal Co., Ltd., New Glasgow, N.S.

During the fiscal year 1918-19 the ss. *War Bee* was built and delivered, length 249 feet, breadth 35 feet, depth 20 feet, speed 9 knots, gross tonnage 1,730.

The following improvements have been made to the plant: the yard space has been doubled, a dock for fitting-out berth has been built and supplied with electric welding machine and McBride plate tighteners. A shop, 160 feet long by 60 feet wide, has been built, with travelling crane, vertical drill, engine lathe, etc.

Canadian Allis Chalmers, Ltd., Bridgeburg, Ont.

This yard is still engaged on the four 3,500-ton ships for the Imperial Munitions Board.

No additions or improvements have been made to this yard during 1918-19.

J. Coughlan & Sons, Vancouver, B.C.

This yard has already delivered to the Imperial Munitions Board six steel cargo vessels, 8,800 tons d.w. each. Four vessels of the same type will be delivered to the I.M.B. during May, June, and July, 1919. This firm also has under contract four vessels of 8,100 tons d.w. for delivery to the Marine Department; prior to undertaking this work for the Marine Department the plant had two structural fabricating shops, with a capacity of 1,000 tons of steel per month; it has now been so extended that it can deliver one steel cargo vessel per month, involving the fabrication and erection of approximately 3,400 tons of steel.

Northern Construction Company, Limited, Vancouver, B.C.

Was established in June, 1917, has a capacity of four berths, and has built for the Imperial Munitions Board six 2,800-ton vessels; at present engaged in building five vessels for the French Government of 1,500 tons each, at an approximate cost of \$325,000 per vessel.

Yarrows, Limited, Esquimalt, B.C.

The work of this plant consists largely in the repairing of ships. One steel stern-wheel steamer, the *Chouk*, length 165 feet, breadth 34 feet, depth 7 feet, draft 3 feet 6 inches loaded, has been completed and delivered to the Government of India.

Eighty vessels, gross tonnage 115,000, have been repaired in dock, and 360 vessels, gross tonnage 65,000, have been repaired afloat.

Minor improvements have been made to the plant during the year.

British American Shipbuilding Co., Ltd., Welland, Ont.

This company has already built three vessels for the Imperial Munitions Board, the dimensions of which were given in last year's report: these were built at an average cost of \$671,000 each. At present they are building for the Marine Department two vessels, length 320 feet B.P., breadth moulded 43 feet 10 inches, depth moulded 25 feet.

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Additions to the plant, such as new shop, new machinery, and increased berth accommodation have been made during the year at a cost of \$120,000.

Cholberg Shipyard, Limited, Victoria, B.C.

Established in 1918, a wooden plant covering three acres on Victoria Harbour waterfront, has three building berths for vessels up to 2,500 tons d.w. and 270 feet in length; at present building three schooners for the Norwegian Government, 1,600 tons d.w., length 190 feet, estimated cost \$200,000 each.

Halifax Shipyards, Limited.

In June, 1918, the Halifax Shipyards, Limited, took over the property of the Halifax Graving Dock, subsequently acquiring new property for a large shipbuilding and repairing plant.

The new property comprises 46 acres, and has a length along the Halifax Harbour front of 3,300 feet.

Old pier No. 7, with a length of 650 feet, to be used as a temporary fitting-out berth has been rebuilt, a new pile wharf 315 feet long has been built east of the graving dock, and the old wharf at the foot of North Ferry street has been rebuilt and extended.

The new permanent buildings consist of:—

Machine Shop.—A fireproof reinforced concrete building, three stories high, 280 feet long, 100 feet wide, with a travelling crane and all necessary machinery for extensive machine work.

Plate Shop.—A fireproof steel and brick building, 600 feet long, 75 feet wide, 60 feet high, with two travelling cranes. The ground floor contains all the machinery for fabricating steel plates for the erection of ships. Above this is located the loft.

Lean-to.—Fireproof, steel and brick, 500 feet long, 32 feet wide, one story high, attached to the west side of the plate shop. In this building plates will be marked before going into the plate shop.

Power House.—Fireproof, steel and brick, 140 feet long, 100 feet wide, two stories high, with travelling crane. This plant is capable of generating 4,000 horse-power. All machinery in connection with the shipyards will be operated by electricity furnished from the power-house. Reinforced concrete chimney 210 feet high, 10 feet diameter at top, eliminates the necessity of the mechanical apparatus for forced draught. Fuel for generating power will be crude oil.

Pump House.—Brick, 40 feet by 24 feet, in which are installed the pumps for pumping out and keeping dry the dry dock. The dry dock has been excavated out of solid rock, and the sides rebuilt with ashlar and concrete; it has a length of 567 feet, breadth 102 feet, with 27 feet of water on keel blocks.

Office and Stores.—Fireproof, reinforced concrete and brick, 285 feet long, 60 feet of which is four stories high, and the remainder of three stories, 50 feet in width, 225 feet of the ground floor and 75 feet of the first floor for stores and compressor plant, the remainder used for offices.

Fire protection is supplied by an 8-inch sprinkler system installed throughout all the buildings. A 1,000-gallons-a-minute Fire Underwriters' pump is installed in the power-house, with direct connections to the 8-inch sprinkler system and to a 40,000-gallon steel tank on a 75-foot steel tower. Two direct 6-inch water mains connected with the Halifax municipal water system supply the plant and the sprinkler system with fresh water.

The shipyards comprise four berths on pile foundations 615 feet long by 60 feet wide, equipped with thirteen steel guy derricks for placing plates in position on new ships.

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The vessels being built for the Marine Department by this firm, and their tonnage, are given in a previous part of the report, under the heading "Canadian Government Shipbuilding Programme."

About 2,000 men are at present on the pay-roll of this firm.

Canadian Car and Foundry Co., Ltd., Fort William, Ont.

This company established in 1918 in connection with its car and foundry work a shipbuilding plant at a cost of \$250,000; it undertook a contract for the French Government to build twelve single-screw steel mine sweepers, length 143 feet, breadth 23 feet, displacement tonnage loaded 630 ; all these were built and delivered.

The company is at present building a single-screw steel cargo steamer, length 209 feet, breadth 32 feet, depth 17 feet.

The National Shipbuilding Co., Ltd., Levis, Que.

The site of this plant, established in 1918, is at the St. Lawrence dock, Levis, Que., it is equipped for the construction of steel steamers, and has a marine railway attached for bringing vessels out of the water for repairs; only one slip is at present built.

The company is now reconstructing the steel dredge *Galveston* into an ocean freighter for a French firm.

Collingwood Shipbuilding Co., Ltd.

During 1918 this company built the following ships: three trawlers, 125 feet by 24 feet by 13 feet 6 inches, 288 gross tons each; oil tanker, 251 feet by 44 feet by 25 feet, 2,631 gross tons; cargo steamer *War Wizard*, 251 feet by 43 feet 6 inches by 20 feet 2 inches, 1,961 gross tons; cargo steamer *War Witch*, 251 feet by 43 feet 6 inches by 20 feet 2 inches, 1,961 gross tons.

The four vessels, with their tonnage and dates of delivery, which this firm is building for the Canadian Department of Marine are given in a previous part of this report under the heading "Canadian Government Shipbuilding Programme."

Dominion Shipbuilding Co., Ltd., Toronto, Ont.

The plant occupies 15 1/5 acres of reclaimed land owned by the Toronto Harbour Commission, from Bathurst street on the west to Spadina avenue on the east, has five berths for canal-sized ships, and, when completed, will include four buildings, approximate cost \$2,500,000. The main building of steel, with reinforced concrete walls, is 485 feet by 210 feet on the first story which contains furnaces, angle-iron shop, smith shop, and punch shop; the second story, 110 feet wide, contains power-house, joiners and carpenters shop, and mould loft.

The second building now completed 425 feet by 110 feet takes in electrical shop, pipe shop, blacksmith shop, and machine and pattern shop. The other two buildings not yet completed will be the foundry and the boiler shop.

Three overhead cranes are used in the erection of steel for ships; all machinery is electrically driven; one set of shear-legs, 100-ton capacity, has been erected.

The capacity of the completed plant will be twelve ships a year of canal size, viz., 261 feet by 43 feet 6-inch beam, 4,300 tons d.w.

The firm had under contract eight vessels, two of 4,300 tons class d.w. which were delivered one in the fall, 1918, and the other at the end of January, 1919; the remaining six vessels are 3,550 tons d.w. each, length overall 261 feet, beam 43 feet six inches, depth twenty-five feet; these will be all built and delivered by the beginning of September, 1919.

The firm has also plans and specifications made for a number of a smaller type of ship which will occupy the plant during the latter half of 1919.

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With the completion of the boiler shop and the foundry in the near future this shipbuilding plant will be entirely self-contained, complete, and up to date.

Canadian Vickers, Ltd., Montreal, Que.

The vessels which this firm has built and is building for the Canadian Government, with their tonnage, are given in the "Canadian Shipbuilding Programme."

During 1918-19 the firm built for the Norwegian Government two single-deck cargo ships, the *Porsanger*, 7,263 tons, and the *Samnanger*, 7,359 tons; and for the Imperial Munitions Board four single-deck cargo vessels, the *War Earl*, 7,211 tons d.w., the *War Duchess*, 7,278 tons d.w., the *War Faith*, 7,263 tons d.w., and the *War Joy*, 7,267 tons d.w.

Thirty-one vessels were repaired on the floating dry dock, representing a gross tonnage of 115,631.

WOODEN SHIPBUILDING PLANTS IN CANADA.

- | | |
|---|--|
| Hankinson Shipbuilding Co., Belliveau Cove, N.S. | Wagstaff & Hatfield, Port Greville, N.S. |
| Bridgewater Shipbuilding Co., Bridgewater, N.S. | Elliott Graham, Port Greville, N.S. |
| W. A. Naugler, Bridgewater, N.S. | Smith Canning, Port Greville, N.S. |
| H. MacAloney, Canning, N.S. | William Crowell, Port Latour, N.S. |
| S. M. Fields, Cape D'Or, N.S. | J. E. Pettis, Spencer's Island, N.S. |
| Chester Basin Shipbuilders, Limited, Chester Basin, N.S. | J. W. Raymond, Port Maitland, N.S. |
| Mortimer Parsons, Cheverie, N.S. | Port Wade Shipbuilding Co., Port Wade, N.S. |
| Bay Shore Shipyard, Church Point, N.S. | C. W. Collins, Granville Ferry, N.S. |
| Moise Belliveau, Church Point, N.S. | E. R. Gaudet, Weymouth, N.S. |
| J. E. Gaskill, Church Point, N.S. | W. R. & C. A. Huntley, Parrsboro, N.S. |
| Leary Brothers, La Have, N.S. | Smith & Rhuland, Lunenburg, N.S. |
| Fidele Boudreau, Church Point, N.S. | Robar Brothers, Bridgewater, N.S. |
| B. L. Tucker, Bass River, N.S. | Fred Comeau, Little Brook, N.S. |
| Comeau Shipbuilding Co., Comeauville, N.S. | G. M. Cochrane, Port Greville, N.S. |
| J. W. Comeau, Comeauville, N.S. | T. K. Bentley, Advocate Harbour, N.S. |
| J. N. Rafuse & Sons, Conquerall Bank, N.S. | Southern Salvage Co., Liverpool, N.S. |
| Hilaire Boudreau, White's Cove, N.S. | Albert Parsons, Walton, N.S. |
| Benjamin Belliveau, Belliveau Cove, N.S. | George A. Cox, Shelburne, N.S. |
| P. A. Theriault & Co., Belliveau Cove, N.S. | W. C. McKay & Son, Shelburne, N.S. |
| J. Newton Pugsley, Parrsboro, N.S. | Joseph McGill Shipbuilding & Transportation Co., Shelburne, N.S. |
| Maurice E. Leary, Dayspring, N.S. | Lewis Shipbuilding Co., Sheet Harbour, N.S. |
| McLean & McKay, Economy, N.S. | E. F. Williams, Dartmouth, N.S. |
| S. J. Soley, Fox River, N.S. | Charles Griffin, Isaacs Harbour, N.S. |
| Allan & Fraser, Fraserville, N.S. | J. W. Kirkpatrick, West Advocate, N.S. |
| Bernard M. Melanson, Gilbert's Cove, N.S. | Archibald McKenzie, River John, N.S. |
| Amos Blinn, Grosses Coques, N.S. | Charles McLellan, River John, N.S. |
| F. K. Warren, Halifax, N.S. | Charles McNeill, New Glasgow, N.S. |
| J. Willard Smith, Hillsburn, N.S. | Cumberland Marine Co., Wallace, N.S. |
| L. S. Canning, Ward's Brook, N.S. | Beazley Brothers, Weymouth, N.S. |
| Annapolis Shipping Co., Annapolis Royal, N.S. | Warren, Rice & Co., Weymouth, N.S. |
| Conrad & Reinhardt, Lunenburg, N.S. | W. K. Smith, Plympton, N.S. |
| R. H. Howes Construction Co., Meteghan, N.S. | Eastern Shipbuilding Co., Ship Harbour, N.S. |
| J. W. Raymond, Little Brook, N.S. | Robert Rutledge, Sheet Harbour, N.S. |
| Ernst Shipbuilding Co., Mahone Bay, N.S. | Robin Jones & Whitman, Liverpool, N.S. |
| Osmond O'Brien, Noel, N.S. | McLean Construction Co., Lunenburg, N.S. |
| Noel Shipbuilding Co., Noel, N.S. | Conrad & Reinhardt, La Have, N.S. |
| Fauquier & Porter, Hantsport, N.S. | McKean & Rodding Company, Liverpool, N.S. |
| Sidney St. C. Jones, Weymouth, N.S. | A. V. Conrad, Parks Creek, N.S. |
| Milton Shipbuilding Co., Yarmouth, N.S. | Saulnierville Shipbuilding Co., Saulnierville, N.S. |
| Clare Shipbuilding Co., Meteghan River, N.S. | Nova Scotia Shipbuilding & Transportation Co., Liverpool. |
| Thomas Gorman, Meteghan, N.S. | Chester Basin Shipbuilders Limited, Chester Basin, N.S. |
| W. J. Foley, Salmon river, N.S. | Foley Brothers, Hantsport, N.S. |
| H. Elderkin & Co., Port Greville, N.S. | Yarmouth Shipbuilding Co., Yarmouth, N.S. |
| A. H. Comeau, Meteghan, N.S. | S. Robichaud, Meteghan River, N.S. |
| J. A. Balcom & Co., Margaretsville, N.S. | Acadia Shipbuilding Co., Saulnierville, N.S. |
| John F. Deveau, Meteghan, N.S. | Stephen Morash & Co., Ship Harbour, N.S. |
| Ernst Shipbuilding Co., Mahone Bay, N.S. | Hilaire T. LeBlanc, Wedgeport, N.S. |
| J. Ernst & Son, Mahone Bay, N.S. | Boehner Brothers, West La Have, N.S. |
| Falmouth Shipbuilding & Transportation Co., Windsor, N.S. | McKenzie Shipping Co., River John, N.S. |
| The Shelburne Shipbuilders Limited, Shelburne, N.S. | C. A. Ham, Mahone Bay, N.S. |
| Dr. F. H. McDonald, Meteghan, N.S. | J. B. Young, Lunenburg, N.S. |
| Meteghan Railway & Shipbuilding Co., Meteghan, N.S. | D. C. Mulhall, Liverpool, N.S. |
| S. Salter, Parrsboro, N.S. | H. A. Frank, Liverpool, N.S. |
| Dowling & Stoddart, Port Clyde, N.S. | Innocent Comeau, Little Brook, N.S. |
| | Amos H. Stevens, Tancook, N.S. |

SESSIONAL PAPER No. 21

WOODEN SHIPBUILDING PLANTS IN CANADA—*Concluded.*

- Swime Brothers, Port Clyde, N.S.
Milton Shipbuilding Co., Yarmouth, N.S.
W. O. Sweeney, Yarmouth, N.S.
C. A. Nickerson, Wood Harbour, N.S.
Boutilier & Co., Centreville, N.S.
Jas. S. Creelman, Bass River, N.S.
Frank P. Comeau, Saulnierville, N.S.
Ambrose D'Eon, West Pubnico, N.S.
H. W. Embrie & Son, Port Hawkesbury, N.S.
Andrew F. Goodwin, East Pubnico, N.S.
Stanford Greenwood, Port Clyde, N.S.
J. S. Gardner, Liverpool, N.S.
Reuben Heisler, Tancook, N.S.
William A. Kenney, Clark's Harbour, N.S.
Jos. H. Landry, River Bourgeois, N.S.
Henry Levy, Little Tancook, N.S.
Stanley Mason, Tancook, N.S.
William H. Richard, River Bourgeois, N.S.
Percy Risser, West Dublin, N.S.
John Strickland, Neil's Harbour, N.S.
Johnson Spicer, Spencer's Island, N.S.
Mansel Trenholm, Port Elgin, N.S.
Pubbicover Shipping Co., Dublin Shore, N.S.
Ethel Sproul, Campbellton, N.B.
C. T. White & Son, Limited, Sussex, N.B.
James X. Lenteigne, Lower Caraqueet, N.B.
International Shipbuilding Co., Newcastle, N.B.
Eureka Shipbuilding Co., North Head, Grand Manan, N.B.
Port Colborne Shipbuilding & Realty Co., Rexton, N.B.
Grant & Horne, St. John, N.B.
Marine Construction Co., of Canada, Limited, St. John, N.B.
St. John Shipbuilding Co., St. John, N.B.
St. Martin's Shipbuilding Co., St. Martin's N.B.
Peter & A. A. McIntyre, St. John, N.B.
Marcel Allain, Neguac, N.B.
John Muse, Eel River, N.B.
The Newcastle Shipbuilding Co., Limited, Newcastle, N.B.
Charles E. Brewster, Albert, N.B., Harvey, P.O.
Herbert A. Ellis, Barachois, Que.
Eug. Bouillon, Paspebiac, Que.
R. N. LeBlanc, Bonaventure, Que.
J. Z. Degagne, Eboulements, Que.
Fraser Brace & Co., Limited, Montreal, Que.
Quebec Shipbuilding & Repair Co., Montreal, Que.
Quinlan & Robertson, Quebec, Que.
H. H. Shepherd, Sorel, Que.
Sincennes-McNaughton Lines, Limited, Sorel, Que.
Leclaire Shipbuilding Co., Sorel, Que.
National Shipbuilding Corporation, Three Rivers, Que.
U. Pauze & Fils, Montreal, Que.
Three Rivers Shipyards, Ltd., Three Rivers, Que.
Donat Charland, Sorel, Que.
Canadian Sand & Gravel Co., 468 William St., Montreal.
Alain Joly, Leclercville, Que.
Montreal Dry Dock Co., Montreal, Que.
Charles Page, Three Rivers, Que.
Moise Robidoux, Yamaska, East, Que.
P. Watters, Hull, Que.
The Cardigan Shipbuilding Co., Cardigan, P.E.I.
Shevlin Clarke Co., Ltd., Fort Frances, Ont.
Oscar H. Smith, Port Stanley, Ont.
R. Morrill, Collingwood, Ont.
Great Lakes Dredging Co., Fort William, Ont.
Davis Dry Dock Co., Kingston, Ont.
Thunder Bay Contracting Co., Fort William, Ont.
Muir Brothers, Port Dalhousie, Ont.
J. W. Gerow, Rossport, Ont.
Toronto Shipbuilding Co., Toronto, Ont.
Geo. Gordon & Co., Cache Bay, Ont.
West Peachy Co., Simcoe, Ont.
H. Vollmers, Nanaimo, B.C.
New Westminster Construction & Engineering Co., New Westminster, B.C.
Star Shipyard Co., New Westminster, B.C.
Pacific Construction Co., Port Coquitlam, B.C.
British Columbia Construction & Engineering Co., New Westminster, B.C.
Northern Construction Co., Vancouver, B.C.
The Foundation Co. of British Columbia, Victoria, B.C.
Western Canada Shipyards Limited, Vancouver, B.C.
William Lyall Shipbuilding Co., Vancouver, B.C.
Vancouver Shipyards Limited, Vancouver, B.C.
Standard Shipbuilding Co., Vancouver, B.C.
W. R. Manchion, Vancouver, B.C.
British American Shipbuilding Co., Vancouver, B.C.
C. E. Bainter, Prince Rupert, B.C.
S. A. Moulton, Prince Rupert, B.C.
Grant, Smith & Co., Vancouver, B.C.
Harrison & Lamond Shipbuilders Limited, Vancouver, B.C.
Taylor Engineering Co., Vancouver, B.C.
Cholberg Shipyards Limited, Victoria, B.C.
Clarence Hoad, Victoria, B.C.
Victoria Shipbuilding Co., Victoria, B.C.
Cameron-Genoa Mills Shipbuilders Ltd., Victoria, B.C.
Atagi & Kamura, Steveston, B.C. (Motor fishing vessels).
K. Asori, Sea Island, B.C. (Motor fishing vessels).
Charles Benson, Vancouver, B.C.
The British Yukon Navigation Co., White Horse, Y.T.
Frederick T. Clark, Vancouver, B.C.
Edward Clapham, Vancouver, B.C.
Christopher, Penny & Fromfeel, North Vancouver B.C.
Canadian Robert Dollar Co., Vancouver, B.C.
Jos. Crane, New Westminster, B.C.
Chappell Bros., Vancouver, B.C.
Fernier & Lucas, Vancouver, B.C.
K. Tambo, Steveston, B.C. (Motor fishing vessels).
Carl Gulbransen, South Westminster, B.C.
W. J. Gillis, Palso Bay, B.C.
James A. Goldsmith, Vancouver, B.C.
Hoffar Motor Boat Co., Vancouver, B.C.
B. Hasegawa, Steveston, B.C. (Motor fishing vessels).
Paul Hellan, Comox, B.C. (Motor fishing vessels).
Rasmus Hansen, Eburne, B.C. (Motor fishing vessels).
I. Isazaki, New Westminster, B.C. (Motor fishing vessels).
Karine and Myutti, Vancouver, B.C. (Motor fishing vessels).
Kishi Bros., Steveston, B.C. (Motor fishing vessels).
T. Kishi, Steveston, B.C. (Motor fishing vessels).
O. Murakami, Steveston, B.C. (Motor fishing vessels).
C. Morishita, Steveston, B.C. (Motor fishing vessels).
G. Nakamura, Steveston, B.C. (Motor fishing vessels).
N. Nakada, Steveston, B.C. (Motor fishing vessels).
John & James Orpana, Lund, B.C. (Motor fishing vessels).
The Ross Navigation Co., The Pas, Man.
T. Sugaro, Steveston, B.C. (Motor fishing vessels).
Roderick Smith, Selkirk, Man.
Richard Stephens, Victoria, B.C.

CONCRETE.

- Montreal Shipbuilders, Limited, 37 Belmont St., Montreal, Que.

SESSIONAL PAPER No. 21

STATEMENT shewing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1918.

Ports.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
Ontario.						
Amherstburg.....	7	1,740	1,706	10	1,201	615
Belleville.....	3	241	217	11	241	144
Bowmanville.....	2	344	116			
Brockville.....	1	819	751	18	1,346	895
Chatham.....	4	566	556	9	971	529
Cobourg.....	1	100	100			
Collingwood.....	5	1,122	1,122	54	18,625	12,695
Cornwall.....				5	170	107
Deseronto.....	5	403	370	6	144	81
Dunnville.....	1	87	57			
Fort William.....	1	413	413	2	4,183	2,539
Goderich.....	6	824	824	30	1,558	1,035
Hamilton.....	3	807	780	21	10,667	6,677
Kenora.....	7	580	580	93	3,549	2,248
Kingston.....	61	9,760	9,201	116	10,696	6,245
Lindsay.....	19	1,224	1,224	28	626	416
Midland.....	7	3,681	3,166	44	50,998	34,493
Napanee.....	1	122	122			
Oakville.....	1	26	26			
Ottawa.....	149	18,607	17,812	282	43,885	23,660
Owen Sound.....	7	2,326	1,995	36	3,401	2,301
Peterborough.....	22	1,698	1,698	58	1,310	883
Picton.....	7	2,285	2,099	12	4,893	3,298
Port Arthur.....	60	20,293	19,804	77	31,670	19,900
Port Burwell.....	1	65	65	10	342	191
Port Dover.....	3	217	217	17	600	395
Port Hope.....	4	527	527	6	116	75
Port Stanley.....				26	1,129	732
Prescott.....	9	1,473	1,345	12	2,222	1,505
Sarnia.....	11	3,547	3,288	39	27,920	17,732
Southampton.....	1	96	50	11	410	278
Sault St. Marie.....	41	8,299	7,948	53	20,275	13,066
St. Catharines.....	28	6,553	5,944	51	1,642	1,079
Simcoe.....	2	36	36	2	35	18
Toronto.....	75	15,989	13,277	302	84,550	53,803
Wallaceburg.....	6	963	920	11	494	342
Whitby.....						
Windsor.....	29	3,400	3,273	22	5,493	3,259
	590	108,333	101,629	1,474	335,362	211,236
Prince Edward Island.						
Charlottetown.....	128	7,776	7,353	30	7,511	3,452
British Columbia.						
New Westminster.....	103	14,244	14,225	241	19,896	12,148
Prince Rupert.....	5	2,218	2,128	42	3,496	2,137
Vancouver.....	278	44,134	43,566	851	152,068	93,654
Victoria.....	119	22,954	21,902	289	69,616	41,753
	505	83,550	81,821	1,423	245,076	149,692
Saskatchewan.						
Saskatchewan.....	1	145	145	4	660	384
Yukon Territory.						
Yukon Territory.....	1	556	556	7	2,312	1,484
Manitoba.						
Winnipeg.....	17	3,394	3,394	79	9,717	6,497

10 GEORGE V, A. 1920

STATEMENT shewing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1918.—*Concluded.*

Ports.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
New Brunswick.						
Chatham.....	380	7,783	7,624	10	4,057	2,465
Dorchester.....	2	277	262	2	8	6
Moncton.....	4	200	177	2	119	60
Richibucto.....	24	584	528	16	298	220
Sackville.....	4	302	265	3	65	45
St. Andrews.....	157	2,830	2,772	37	761	511
St. John.....	211	22,877	22,176	100	19,487	12,372
	782	34,853	33,804	261	24,795	15,679
Nova Scotia.						
Amherst.....	2	97	80	3	168	95
Annapolis Royal.....	15	3,526	3,064	6	330	178
Arichat.....	90	2,169	2,140	25	404	371
Barrington.....	68	1,525	1,495	25	484	427
Canso.....	44	802	802	3	40	37
Digby.....	87	3,391	3,239	12	319	228
Guysboro..	8	488	453			
Halifax.....	287	12,867	12,484	134	16,976	9,885
La Have.....	18	4,685	3,966	2	79	75
Liverpool.....	35	3,435	3,071	26	1,482	788
Lunenburg.....	238	24,725	20,294	143	2,956	2,403
Maitland.....	10	1,548	1,376	1	88	59
Parrsboro.....	45	13,510	12,493	9	823	529
Pictou.....	12	1,250	1,166	15	2,264	1,409
Port Hawkesbury.....	63	1,420	1,404	8	193	163
Port Medway.....	10	840	793	5	76	71
Shelburne.....	51	2,625	2,211	19	768	589
Sydney.....	75	3,928	3,718	42	2,263	1,369
Truro.....				1	18	7
Weymouth.....	21	2,907	2,547	12	759	534
Windsor.....	40	19,779	18,298	14	2,866	1,615
Yarmouth.....	178	4,431	4,272	46	8,916	4,319
	1,397	109,948	99,366	551	42,272	25,151
Quebec.						
Gaspé.....	17	858	787	1	209	142
Magdalen Islands.....	12	490	481	2	149	103
Montreal.....	284	89,956	86,601	318	192,421	118,920
Paspebiac.....	19	517	497	6	128	82
Quebec.....	414	33,808	33,003	164	31,587	17,677
Sorel.....	35	12,423	11,358	46	11,809	5,584
	781	138,052	132,727	537	236,303	142,508

RECAPITULATION.

Province.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
New Brunswick.....	782	34,853	33,804	261	24,795	15,679
Nova Scotia.....	1,397	109,948	99,366	551	42,272	25,151
Quebec.....	781	138,052	132,727	537	236,303	142,508
Ontario.....	590	108,333	101,629	1,474	335,362	211,236
Prince Edward Island.....	128	7,776	7,353	30	7,511	3,452
British Columbia.....	505	83,550	81,821	1,423	245,076	149,692
Manitoba.....	17	3,394	3,394	79	9,717	6,397
Yukon Territory.....	1	556	556	7	2,312	1,484
Saskatchewan.....	1	145	145	4	660	384
Totals.....	4,202	486,607	460,795	4,366	904,008	555,983

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COMPARATIVE STATEMENT showing the number of Vessels and Number of Net Tons on the Registry Books of the Dominion of Canada, on December 31, in each Year from 1909 to 1918, both inclusive.

Province.	1909.		1910.		1911.		1912.		1913.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick.	937	62,984	951	59,637	966	55,872	1,001	57,369	1,031	60,020
Nova Scotia.....	2,058	160,286	2,054	149,737	2,105	142,631	2,158	143,295	2,106	138,107
Quebec.....	1,432	175,370	1,499	189,945	1,511	193,682	1,566	227,048	1,628	247,225
Ontario.....	2,061	208,652	2,027	227,457	2,014	236,877	2,017	253,376	2,012	279,642
P.E. Island.....	150	10,154	150	10,100	149	9,683	148	9,577	149	10,071
British Columbia	1,020	92,746	1,109	105,414	1,227	122,264	1,376	136,618	1,506	15,306
Manitoba.....	90	5,087	94	5,565	96	6,373	95	6,096	93	5,545
Yukon District..	16	2,984	16	2,784	15	2,708	14	2,543	15	2,940
Saskatchewan....	4	290	4	290	5	356	5	356	5	356
	7,768	718,553	7,904	750,929	8,088	770,446	8,380	836,278	8,545	896,965
Province.	1914.		1915.		1916.		1917.		1918.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick	1,052	55,522	1,068	56,219	1,074	49,817	1,074	49,883	1,043	49,483
Nova Scotia.....	2,098	135,053	2,087	125,567	2,064	123,058	2,010	119,805	1,948	124,517
Quebec.....	1,663	259,143	1,590	267,897	1,452	273,770	1,391	283,942	1,318	175,235
Ontario.....	2,100	314,660	2,111	312,971	2,116	328,531	2,079	311,283	2,064	312,865
P.E. Island.....	149	10,029	158	11,518	155	10,652	157	10,955	158	10,805
British Columbia	1,591	147,192	1,643	144,835	1,687	145,525	1,734	183,002	1,928	231,513
Manitoba.....	103	7,999	84	7,480	95	8,953	5	530	96	9,791
Yukon District..	11	2,295	11	2,295	11	2,295	99	9,834	8	2,040
Saskatchewan....	5	529	5	530	5	530	10	2,204	5	529
	8,772	932,422	8,757	929,312	8,659	943,131	8,559	971,438	8,568	1,016,778

10 GEORGE V, A. 1920

COMPARATIVE STATEMENT of New Vessels built and Registered in the Dominion of Canada and their Net Tonnage during the Year ended December 31, in each Year from 1909 to 1918, both inclusive.

Province.	1909.		1910.		1911.		1912.		1913.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick	14	666	17	397	25	774	44	1,092	45	1,114
Nova Scotia.....	75	6,007	82	5,572	136	5,340	126	5,853	67	4,899
Quebec.....	66	5,895	58	7,012	30	2,726	49	5,744	62	8,667
Ontario.....	73	7,973	46	3,612	42	10,086	71	11,170	38	15,572
P.E. Island.....	1	5	2	23	4	61	1	34	3	804
British Columbia	93	4,068	84	5,177	98	7,781	128	10,647	128	9,000
Manitoba.....	5	692	5	490	3	902	1	546	1	18
Yukon District										
Saskatchewan...					1	66				
	327	25,306	294	22,283	339	27,736	420	34,886	344	40,164

Province.	1914.		1915.		1916.		1917.		1918.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick.	31	1,319	22	1,114	22	332	23	1,156	16	2,590
Nova Scotia.....	56	3,303	51	2,982	65	7,661	86	14,781	110	27,831
Quebec.....	51	6,753	49	7,790	51	8,643	32	8,058	26	9,086
Ontario.....	78	23,567	38	4,709	26	5,507	21	3,949	48	10,098
P.E. Island.....	2	35	2	24					4	78
British Columbia	97	5,867	79	2,057	65	4,487	77	17,452	192	54,889
Manitoba.....	11	2,899	5	156	15	1,573	4	881	1	39
Yukon District..	1	3								
Saskatchewan..										
	327	43,246	246	18,832	244	28,303	243	46,277	397	104,611

STATEMENT showing Number of Vessels Removed from the Registry Book of the Dominion of Canada during the Year ended December 31, 1918.

	Number.
Sold to foreigners.....	44
Wrecked.....	20
Stranded:.....	11
Lost.....	11
Broken up, etc.....	166
Abandoned at sea.....	5
Collisions.....	1
Foundered.....	24
Burnt.....	12
Transferred to St. John's, Nfld.....	90
" Australia.....	1
" Great Britain.....	6
" South Africa.....	2
Missing.....	20
Registry no longer required.....	6
Sunk by enemy.....	23
Total.....	442

It is estimated that 44,103 men and boys, etc., inclusive of masters, were employed on ships registered in Canada during the year 1918.

SESSIONAL PAPER No. 21

CHIEF ENGINEER'S REPORT.

OFFICE WORK.

Total plans for twelve months (April 1 to March 31, 1919).....	1,310
Charts received and recorded.....	108
Charts received and entered in chart books.....	19
Photographs received and recorded.....	171
Specifications and bills of material written.....	60
Notices to Mariners issued (comprising 287 subjects).....	113

In addition to the work of this branch, the staff has been called upon to perform work for other branches of the service. For the Meteorological Service the re-erection and improvements to the storm signal mast at Port Arthur, Ont., also erection of mast at Souris, P.E.I.

PUBLICATIONS.

During the fiscal year 113 Notices to Mariners, covering 287 subjects, were issued.

The following may be especially noted:—

Publications of warnings or regulations necessitated by the war with regard to vessels' lights; public traffic regulations; exhibition of signals and the extinguishing of lights.

Since the conclusion of the war notices have been issued covering the rescinding of regulations and restrictions necessitated by the war; re-exhibition of lights as before the war; instructions for sailing ships and general mine warnings to mariners.

Improvements of channels by dredging, done by the Department of Public Works, were also described.

Uncharted dangers, wrecks and derelicts were reported and described.

Hydrographic notes were published, also information respecting Radiotelegraph Direction Finding stations, and particulars with reference to the broadcasting of weather forecasts by the Radiotelegraph stations on the Great Lakes and connecting waters. A notice giving a list of all the lights on the Trent Canal system was also published.

Notices relating to waters outside of Canada were issued, covering items relating to Newfoundland, Atlantic and Pacific waters of the United States, Panama canal, Jamaica, as well as notices relating to transatlantic and trans-pacific subjects.

The annual edition of the "List of Lights and Fog Signals" was prepared and published.

PRESCOTT DEPOT.

The Prescott Depot has been operated as usual during the past fiscal year. Year after year a large quantity of stock, unused and returned materials, had accumulated and the stock records had become unwieldy. A complete re-organization of the stock was undertaken at the beginning of the past fiscal year; all materials and goods regularly kept at the depot were classified and a list of this standard stock made and forwarded to all agents, engineers and designers of the department.

10 GEORGE V, A. 1920

A new card system was devised and the balancing of these cards at the end of the fiscal year has given the following results for the nine and a half months beginning on the 15th June, 1918:—

Total sales.....	\$49,422 30
Gross profit.....	8,531 88

This profit covers not only the upkeep of the stores—storekeeper, storemen, shipper and packer's wages—but also that part of the general expenses of the Depot that can reasonably be charged to stores.

The value of the stock on the 31st March, 1919, was \$170,998.67.

REMOVAL OF OBSTRUCTIONS TO NAVIGATION.

- Georgetown, P.E.I.....Schooner *Circassian*, loaded with coal, was wrecked in the harbour. The masts, which were a menace to navigation, were pulled out by steamer *Ostrea*.
- Lake Erie, Ont.....Steamer *Henry Cort*, which was wrecked four miles west from Colchester reef lighthouse, was removed by the owners.
- Little Current, Ont.....A scow, loaded with iron, sunk in the channel, was subsequently removed by the owners.

MAINTENANCE AND REPAIRS TO WHARVES.

The following is a list of wharves where repairs were attended to by this branch:—

<i>Nova Scotia.</i>	<i>Quebec.</i>	<i>P. E. I.</i>
Arichat	Amherst	Bay View
Digby	Berthier	Haggarty wharf
Freeport	Chicoutimi	Hickey's wharf
Granville centre	Les Eboulements	Keir's shore wharf
Hampton	Mechins	Murray harbour
Kingsport	New Carlisle	St. Mary's wharf
Saulnierville	Paspebiac	Sturgeon wharf
Shelburne	Rivière Blanche	
	Roberval	
	St. Famille	
	Ste. Irene	
<i>New Brunswick.</i>	<i>British Columbia.</i>	<i>Ontario.</i>
Lamek	Sidney	Midland
		North Bay
	<i>Montreal District.</i>	South Lancaster
	Masson.	

ICE BREAKING.

The contract with the Canadian Towing & Wrecking Company, to keep the harbours at the head of lake Superior open for navigation until December 17 in each year, and to open them in the spring as soon as the canal at Sault Ste. Marie is open for navigation, expired this year.

New tenders were invited for a five year term. The Great Lakes Transportation Company, being the lowest tenderer, was awarded the contract, which dates from July 2, 1918.

SESSIONAL PAPER No. 21

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

NOVA SCOTIA.

Lightstation.	Nature of Work.
Cape Fourchu.....	Repairs to fog alarm building and conversion of steam plant to an oil plant.
Cape Freels.....	Improvement in the water supply.
Cape Roseway.....	Erection of iron lantern on new concrete deck and installation of 3rd order apparatus.
Cape St. Mary.....	Erection of new lantern and flashing catoptric apparatus.
Chebucto Head.....	Repairs to lightstation.
Dartmouth.....	Installation of heating system in storehouse and offices.
Glance bay.....	Front range light tower erected on new site.
Halifax.....	Two gas and whistling buoys converted into the Aga stsyem
Ingonish.....	Illuminating apparatus improved by the installation of flashing reflector and Reliance clock.
Mauger beach.....	Repairs to breakwater.
Parrsboro.....	Reconstruction of dwelling, installation of small diaphone, and 2½ h.p. oil engine.
St. Paul Island.....	Installation of water supply.
Salvages.....	Repairs to fog alarm station and construction of runway.
Seal Island.....	Steam fog alarm plant replaced by an oil plant.
Sheet Rock.....	Repairs to dwelling, re-shingling roof of shed, and rebuilding boat slip.
Victoria beach.....	Repairs to road.

NEW BRUNSWICK.

Bridges point.....	Cribwork under tower renewed.
Cape Spencer.....	Erection of 30 ft. concrete tower, 8 ft. lantern, and installation of apparatus.
Cape Tormentine.....	Back and front range towers raised.
Escuminac.....	Installation of an oil pumping plant.
Gannet rock.....	Installation of an oil pumping plant and hoist.
Grindstone Island.....	Installation of an oil pumping plant.
Miscou Island.....	Installation of an oil pumping plant.
Negro point.....	Pointing stonework of the pier.
Partridge Island.....	Installation of an oil pumping plant.
Point Lepreau.....	Apparatus improved by the installation of triple flash reflector.
Pompey ledge.....	Repairs to spindle.
Quaco.....	Erection of derrick, and construction of landing.
St. John Agency.....	Repairs to gangways, doors, etc., of sheds and repairs to equipment on wharves.
Tongue shoal.....	Installation of Aga system.

PRINCE EDWARD ISLAND.

Brighton beach.....	Front range light moved to a new site.
Cape Egmont.....	Repairs to fence.
Charlottetown.....	Repairs to wharf.
East point.....	Installation of modern diaphone plant.
Fish Island.....	Outer range light removed.
Murray harbour.....	Repairs to outer range light foundation.
North Rustico.....	Repairs to breastwork.
St. Peters.....	Moving inner range light.
Souris.....	Repairs to cottage.
Summerside.....	Moving front range light to new site.

QUEBEC.

Anse St. Joan.....	Oil shed moved.
Cape Chat.....	Installation of a modern diaphone plant to replace bomb signals.
Cape Dogs.....	Installation of 55 mm. Diamond burner.
Cape Gaspé.....	Repairs to tower and installation of double flash reflector.
Cape Madgalen.....	Installation of 55 mm. Diamond burner.
Cape Ray.....	Repairs to road.
Charleton point.....	Erection of double dwelling.
Cloridorme.....	Installation of headlight lantern.
Fame point.....	Repairs to retaining wall.
Godbout.....	Establishment of hand fog-horn.
Grand Entry.....	Repairs to protection work and erection of temporary pole
Grande Vallée.....	Installation of headlight lantern.
Great Fox river.....	Installation of headlight lantern.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

QUEBEC—*Concluded.*

Lightstation.	Nature of Work.
Greenly Island.....	Steam plant replaced by an oil plant.
Griffin cove.....	Installation of headlight lantern.
Little Metis.....	Installation of 55 mm. Diamond burner.
Mont Louis.....	Installation of headlight lantern.
New Carlisle.....	Erection of shelter shed and installation of anchor lantern with hoisting gear.
North point.....	Erection of double dwelling, nearly completed.
Point des Monts.....	Erection of new fog alarm building, provision and installation of engines, compressors, and 3-inch diaphone.
Port Daniel.....	Erection of a 22 ft. concrete tower to replace tower destroyed by fire, also provision and installation of cast iron lantern and illuminating apparatus.
Quebec Agency.....	Installation of new main pipe for heating system in the workshops.
Rivière à la Martre.....	Installation of 55 mm. Diamond burner.
Ste. Anne des Monts.....	Installation of headlight lantern.
Sandy beach.....	Repairs to pier.
Table head.....	Continuation of work of erecting lighthouse, dwelling and installation of engines for fog-alarm plant.
Upper Traverse.....	Repairs to pier and installation of 55 mm. Diamond burner.
Caron point.....	Installation of 5th order lens.
Dorval.....	Installation of 5th order lens.
L'Orignal.....	Installation of Daylite lamps.
Montreal Agency.....	Scows <i>Adelard, Quebec, etc.</i> , repaired.
Pointe à Cadieux.....	Installation of Aladdin lamp.
Pointe au Chene.....	Installation of Aladdin lamp.
Pointe Claire.....	Installation of 5th order lens.
St. Pierre les Becquets..	Erection of range lights and installation of 5th order lens.
Sorel.....	Manufacture of 3 shallow draft bell buoys.
	Manufacture of 6 gas whistling buoys.
	Manufacture of 6 reinforced steel ice buoys.
	Manufacture of 4 gas buoys.

ONTARIO.

Amherstburg.....	Iron fence painted and repairs to wharf and scow <i>Prescott.</i>
Burnt Island.....	Erection of new boathouse, installation of water pumping device, etc., also installation of 5th order lens.
Colchester reef.....	Repairs to pier.
Cobourg.....	Erection of concrete shed for Aga tank.
Davieaux Island.....	Completion of tower started last year.
Goderich.....	Repairs to tower and lantern, and installation of reflector; also repairs to platform of main tower.
Great Duck Island...	Erection of 70 foot concrete tower and installation of a 3rd order lens and 10-foot lantern.
Lamb Island.....	Construction of boat slipway and pier.
Leamington.....	Provision of a hand fog horn.
Lyal Island.....	Installation of a Reliance clock.
Main Duck Island...	Repairs to boathouse, breakwater, and concrete foundations placed under oil shed.
Mohawk Island....	Installation of reflector and 35 mm. burner.
Parry Sound.....	Repairs to scow <i>Parry Sound.</i>
Port Burwell.....	Erection of fog alarm building and installation of 1½-inch diaphone operated by a gas engine.
Port Stanley.....	Installation of armoured cable for fog alarm plant.
Prescott.....	Changes made in jointer shop; manufacture of submarine mechanism.
Rainy River.....	Repairs to front range light pier; erection of ten beacons.
Saugeen river.....	Repairs to front lighthouse tower.
Wolfe Island.....	Installation of 5th order lens.

BRITISH COLUMBIA.

Brotchie ledge...	Changing location of cable and land terminals.
Fisgard.....	Repairs to tower and dwelling.
Green Island....	Provision of hand fog horn.
Namaino.....	Erection of a creosoted 7-pile beacon.
Pelly Island.....	Rebuilding of beacon.
Prospect Point..	Alterations to semaphore signals.
Saturna Island...	Installation of double flash reflector.
Trial Island.....	Electric equipment transferred from McLoughlin point.

COMMISSIONER OF LIGHTS REPORT.

The principal work performed has been an extension of the buoy and beacon services, together with the maintenance of lights and other aids to navigation throughout the Dominion, and the maintenance and inspection of public wharves. The operations of this branch are set forth in tabular form in two inclosures.

In former reports it had been my habit to add further inclosures giving the names of light stations and lightkeepers, a complete list of stations at which gas buoys were maintained, new establishments of gas and signal buoys, with-drawals, and a statement giving complete list of stations at which submarine bells were maintained. As this information is already contained in other government publications it is not repeated here

INCLOSURE No. 1.—Statement, by districts, showing the number of lights of the several orders, lightships, lightboats, lightkeepers, fog signals, buoys submarine bells, etc.

	1st order lights.	2nd order lights.	3rd order lights.	4th order lights.	5th order lights.	6th order lights.	7th order lights.	Gas beacons.	Pressed lens lights & other minor types.	Catoptric lights.	Electric lights.	Total.	Lightships.	Lightboats.	Lightkeepers.	Diaphones.	Fog guns and bombs.	Fog horns and trumpets.
New Brunswick...		2	4	21	14	19	57	2	16	42	4	181	1	1	147	15		1
Nova Scotia.....	3	5	12	52	28	32	68		27	75	12	314	2		291	25	1	1
Prince Edward Island..				15	2	2	8		4	53	1	85			53	2	1	
Quebec.....	5	7	15	22	6	16	42	5	18	87	10	233	4		183	29	4	
Hudson Bay and Strait								10				10						
Montreal.....				10	12	7	18	6	34	146	5	238			160			
Prescott.....			3	17	5	6	17	19	8	9	3	87			47	10		
Parry Sound.....		5	10	21	14	14	51	27	34	64	22	262	1		145	23		1
Kenora.....							3		2	2	2	9			6			
Manitoba.....				2	3		4			5	1	16			10			
British Columbia.....	5	1	5	11	8	2	18	59	10	7	16	142	1		80	24		
Total.....	13	20	49	171	92	98	286	128	154	490	76	1,577	9	1	1,122	128	6	3

	Fog whistles.	Sirens.	Fog bells.	Hand fog horns.	Hand fog bells.	Total fog signals	Fog signal stations only.	Gas buoys.	Gas and whistling buoys	Gas and bell buoys.	Whistling buoys	Bell buoys.	Submarine bell buoys	Total gas and signal buoys	Lightship sub- marine bells.	Total sub- marine bells.	Lighted spar buoys, floats, and dolphins.	Unlighted buoys.	Stakes, bushes, and balises.	Unlighted dol- phins, spindles and beacons.
New Brunswick...	1		5	1		39	4	14	11	2	8	27	1	66	1	2		849	1,469	18
Nova Scotia.....	3		6	56		92	4	6	21	11	16	45	5	104	1	6		1,323	139	44
Prince Edward Id.				2		5		1	5	1	5	7		19				400	401	5
Quebec.....	4	1		25	4	67	1	65		8		1	2	76	3	5	1	172	125	41
Hudson Bay and Strait																				
Montreal.....								90						90			59	524	180	128
Prescott.....			3	6	1	20		36		1		1		38				522		4
Parry Sound.....	2	1	3	36		66		36	4	8		2		50	1	1	28	555	39	55
Kenora.....																		365		
Manitoba.....				4		4												25		
British Columbia..			12	10		45	3	3	11	5	2	3		24	1	1	14	190		113
Total.....	10	2	29	156	5	338	12	251	52	36	31	86	8	467	7	15	102	4,924	2,353	408

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INCLOSURE No. 2.—Statement, by localities, giving the number of unlighted buoys, stakes, bushes, balises, dolphins, spindles and beacons maintained throughout the Dominion during the fiscal year ended 31st March, 1919.

NEW BRUNSWICK DISTRICT.

Locality and number of stakes, bushes, etc.	No. of Buoys	Locality and number of stakes, bushes, etc.	No. of Buoys
Aldouane, 42 bushes.....	5	Mink island.....	1
Alma.....	3	Miramichi bay and river, 12 bushes, 12 winter spar buoys.....	38
Avon river (Nova Scotia).....	4	Miramichi bay, Grandoon channel.....	20
Baie du Vin, 8 bushes.....	10	Miramichi river, Northwest branch.....	14
Baie Verte and Port Elgin, 30 stakes.....	6	Miramichi river, Southwest branch.....	9
Bartibog and Black rivers, 12 bushes.....	1	Miscou.....	8
Bathurst.....	37 A	Musquash.....	7
Beaver Harbour.....	4	Napan river, 24 stakes.....	3
Black Brook, Miramichi river....	3	Neguae.....	19
Blacks Harbour.....	3	Old Man rock (Nova Scotia).....	1
Bliss Island.....	1	Old Woman rock (Nova Scotia).....	1
Buctouche, 34 stakes.....	22	Owls head (Nova Scotia).....	1
Buctouche river, 260 bushes.....		Ox head ledges.....	3
Campobello.....	10	Pea point.....	1
Caraquet.....	16	Pease island (Nova Scotia).....	1
Caraquet to Mizzenette.....	3	Petitecodiac river.....	12
Chambers rock.....	1	Petit Rocher.....	1
Chamcook harbour entrance.....	1	Pokemouche, bushes.....	6
Chance Harbour.....	2	Quaco.....	1
Chebogue (Nova Scotia).....	1	Racket.....	2
Clarke Harbour (Nova Scotia)....	1	Restigouche river and Chaleur bay.....	22
Cocagne, 30 stakes.....	11	Richibucto.....	38
Cumberland basin (Nova Scotia)....	2	Richibucto, Rexton and Browns yard.....	30
Deadmans head.....	1	Roaring Bull rock (Nova Scotia).....	1
Digby, Annapolis river and Bear river (Nova Scotia).....	15	Robinsons ball station, Wood Harbour (Nova Scotia).....	2
Digdequash.....	6	St. Andrews, 2 beacons, 3 stakes.....	17
Dipper Harbour.....	5	St. Charles river, 60 bushes.....	
Dorchester.....	3	St. Croix.....	9
Grande Anse.....	4	St. John harbour.....	3
Grandigue, 30 stakes, 20 bushes.....	2	St. John river, 150 stakes.....	84
Grand lake, bushes.....	32	St. Louis, 70 bushes.....	9
Grand Manan, 11 spindles.....	19	St. Louis river, 54 bushes and stakes.....	
Grand passage (Nova Scotia).....	3	St. Simon bay, 15 bushes....	6
Grassy island, St. John river, 18 stakes.	7	Salmon river, bushing.....	15
Great Shemogue.....	7	Schooner rock (Nova Scotia).....	1
Gull ledges (Nova Scotia)....	1	Scotchtown.....	6
Hatfield point, St. John river, bushes...	1	Shampiers wharf, 15 bushes.....	2
Huckleberry gully, 32 bushes.....	7	Shediac.....	19
Indian point bar channel, Grand lake, 10 bushes.....	3	Shippigan, 27 pickets, 30 stakes, 1 beacon....	27
Johns ledge (Nova Scotia).....	1	Stay point, Lepreau river.....	1
Kouchibouguac and Black Lands gully, 150 bushes.....	14	Tabusintac.....	20
Letite, L'Etang and Bliss Harbour.....	14	Tracadie, North gully, 100 bushes.....	12
Little Shemogue, 2 poles.....	5	Teacadie, Sough gully, 30 bushes.....	5
Little Shippigan.....	4	Tynemouth creek.....	4
Lorneville.....	1	Washadamoak lake, 144 bushes.....	2
Magaguadavic.....	13	Waweig river.....	2
Man O'War rock.....	2	West isles, 4 spindles.....	23
Maquapit and French lakes, 57 stakes.....	13	Weymouth (Nova Scotia).....	1
		Yarmouth (Nova Scotia).....	9

NOVA SCOTIA DISTRICT.

Advocate Harbour.....	9	Big Lorraine (Lorembec harbour).....	3
Amherst basin.....	4	Birchtown.....	5
Apple river.....	8	Blandford.....	5
Argyle river and sound.....	10	Boulaceet, Gillies point.....	1
Arichat.....	19	Brule.....	9
Barrington, 11 dolphins.....	45	Calf island bay.....	5
Bear river.....	7	Canso and St. Andrews passage, 20 winter buoys.....	30
Beaver harbour.....	9	Cape Negro and Northeast harbour.....	17
Beaver island.....	1	Caribou.....	6
Beaver narrows, C.B.....	2		

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INCLOSURE No. 2.—Statement, by localities, of buoys, etc.—*Continued.*NOVA SCOTIA DISTRICT—*Concluded.*

Locality and number of stakes, bushes, etc.	No. of Buoys	Locality and Number of stakes, bushes, etc.	No. of Buoys
Chester and Gold river.....	28	New harbour, 1 winter spar.....	1
Cheticamp.....	12	Northport.....	12
Chezzetcook and Petpeswick.....	10	Orangedale.....	3
Christmas island and Barra strait.....	11	Orpheus, off Green island.....	1
Clarks harbour.....	17	Parrsboro.....	6
Clyde river.....	5	Pennant harbour.....	11
Cockerwitt pass and Woods harbour, 1 spindle.....	18	Petit de grat, 6 winter buoys.....	18
Coddle harbour.....	6	Petpeswick inlet.....	1
Cooks Cove (Toby cove).....	4	Pollock shoal, off West Ironbound island.....	1
Country harbour.....	1	Pope harbour.....	4
Crow harbour.....	3	Port Bickerton, 3 winter buoys.....	15
Denny river.....	3	Port Felix, 1 staff.....	11
Descousse and Lennox passage.....	29	Port Hood, 2 winter buoys.....	5
Deveaux shoal, off Betty island.....	1	Port Latour, 1 spindle.....	16
Dover.....	7	Port L'Hebert.....	13
East bay, Bras d'Or.....	5	Port Medway.....	4
East Dover.....	3	Port Morien.....	1
Eskasoni.....	6	Port Mouton.....	9
Fourchu harbour.....	15	Pringle harbour.....	4
Freeport, 1 beacon.....	3	Prospect, Lower.....	10
Gegoggin.....	7	Prospect, Upper.....	4
Glace bay.....	6	Pubnico.....	21
Goose bay, 35 stakes.....	8	Pugwash.....	8
Grand Etang.....	4	Ram rock, Jordan bay.....	1
Great Bras d'Or.....	7	River Bourgeois.....	6
Guysborough.....	5	River John, stakes.....	3
Habitants bay.....	4	River Phillip.....	6
Halifax.....	21	Rose bay.....	6
Harrigan cove.....	3	Roseway.....	5
Hautford shoal, off cape Hogan.....	1	St. Ann.....	12
Havre Bouche, 6 stakes.....	4	St. Margaret bay.....	6
Indian harbour.....	4	St. Mary river, winter buoys.....	11
Ingonish, South bay.....	9	St. Mary river to Sherbrooke.....	18
Isaac harbour, 9 winter buoys.....	13	St. Peter bay, 4 winter buoys.....	16
Jeddore, winter buoys.....	12	St. Peter inlet.....	12
Johnson harbour.....	5	Sambro.....	29
Ketch harbour.....	6	Shad bay.....	4
Kieley cove, Blind bay.....	4	Shag bay.....	8
Lahave.....	9	Shag harbour.....	17
Lahave river.....	6	Sheet harbour, 5 winter buoys.....	9
L'Ardoise.....	5	Shelburne.....	9
Larry river, 7 stakes.....	3	Ship harbour, lower, 6 winter buoys.....	11
Liscomb, winter spars.....	7	Shulie.....	8
Little Bras d'Or.....	12	Slaughenwhite ledge, Hubbard cove.....	1
Little Dover.....	9	Smith island, West bay.....	1
Little Liscomb.....	4	Sober island to Ecum Secum.....	22
Little Lorembec (Little Lorraine).....	5	Spry bay.....	6
Little Narrows, C.B.....	10	Stoney island, Baddeck.....	1
Liverpool.....	10	Strait of Canso.....	3
Lockeport.....	14	Sydney harbour.....	6
Louisburg, 6 winter buoys.....	8	Tancook island.....	3
Lunenburg.....	8	Tangier, 7 winter buoys.....	7
Lunenburg, back cove.....	9	Tatamagouche, 46 stakes.....	18
Lunenburg, middle south, 6 winter buoys.....	16	Terence bay.....	3
Mabou, stakes.....	20	Three Fathom harbour.....	5
Mahone bay, 1 beacon.....	12	Tidnish, stakes.....	5
Main-a-dieu.....	5	Tor bay.....	21
Marble Mountain.....	5	Tusket river.....	9
Margaree harbour, 7 stakes.....	3	Tusket Wedge, 3 spindles.....	17
Marie Joseph and Ecum Secum, 11 winter buoys.....	16	Voglers cove.....	3
Martins brook.....	6	Walkerville.....	3
McKinnon harbour.....	6	Wallace, 33 stakes.....	11
McNab cove.....	2	Walton harbour.....	1
McVarish shoal and Campbell point, Bras d'Or.....	4	Washaback river.....	7
Merigomish, bushes.....	6	West bay.....	5
Middle ledge or South Easter, entrance to Country harbour, 1 winter buoy.....	1	West Chezzetcook.....	7
Monsillier, 4 stakes.....	6	West Dublin.....	12
Musquodoboit.....	15	Weymouth.....	19
Neil harbour.....	1	Whitehaven, 5 winter buoys.....	8
		Whycocomagh.....	4
		Yarmouth, 27 dolphins.....	

INCLOSURE No. 2.—Statement, by localities, of buoys, etc.—Continued.

PRINCE EDWARD ISLAND.

Locality and number of stakes, bushes, etc.	No. of Buoys	Locality and number of stakes, bushes, etc.	No. of Buoys
Amherst harbour (Magdalen islands).....	8	Jourimain shoal (New Brunswick).....	2
Bay Fortune.....	3	Little channel.....	3
Beach point.....	3	Malpeque and Darnley, 2 stakes.....	25
Belle river.....	3	Miminegash.....	6
Brae harbour.....	5	Miscouche.....	2
Brudenell river.....	5	Montague, 10 stakes.....	7
Cape Bear.....	1	Murray harbour and rivers, 25 stakes, 1 winter spar.....	36
Cape Sharp.....	1	New London—French river, 15 stakes.....	9
Cardigan, lower, 2 winter buoys.....	7	North river, 14 stakes.....	3
Cardigan, upper.....	20	Orwell and Vernon rivers, 36 bushes, 4 beacons.....	3
Cascumpeque, 13 stakes.....	16	Pictou (Nova Scotia).....	7
Charlottetown.....	14	Pinette, 24 bushes.....	8
Covehead.....	3	Point du Chene (New Brunswick).....	1
Crapaud, stakes.....	8	Point Prim.....	1
East river, 15 stakes, 8 bushes.....	14	Port Hill.....	12
Egmont bay, North, 19 stakes.....	9	Pownall, 10 stakes.....	9
Egmont bay, South, 13 stakes.....	3	Rifleman reef.....	1
Entry island and Amherst island passage (Magdalen islands).....	7	Rollo bay.....	3
Georgetown and St. Marys bay, 6 winter spars.....	21	Rustico, 30 stakes.....	6
Goose and Palmer Harbours.....	5	St. Peter harbour, 6 stakes.....	5
Grand entry (Magdalen islands).....	17	Sandy Hook (Magdalen islands).....	1
Grand river (Boughton river) 72 bush stakes, 1 beacon.....	12	Savage harbour.....	2
Grand river, off Cape Sixteen, Malpeque bay.....	8	Souris.....	4
Grand Tracadie.....	4	Stanley and Bayfield channel, Southwest river—Clifton bridge, 14 stakes.....	9
Great Shemogue (New Brunswick).....	2	Summerside, 10 stakes.....	10
House harbour (Magdalen islands).....	11	West Point.....	2
Jourimain reef (New Brunswick).....	1	West river, 65 stakes.....	8
		Wood island.....	4

QUEBEC DISTRICT.

Anse a Beaufils.....	1	Maria.....	2
Anse aux Gascons.....	1	Matane.....	2
Barachois de Malbaie.....	1	Moaisie river.....	2
Beaudry shoal, Gaspé basin.....	1	Natashkwan.....	4
Beauport.....	3	New Richmond.....	3
Bonaventure.....	11	Nouvelle roads.....	2
Cap Chat.....	1	Paspebiac.....	1
Cape Cove.....	1	Pentecost.....	1
Cape d'Espoir.....	1	Perce.....	2
Carleton point.....	1	Point St. Peter.....	1
Echourie rock (Serpent reef).....	1	Port Daniel.....	1
Fox river.....	1	Portneuf-en-bas.....	9
Gros-cap-aux-Os.....	1	River St. Lawrence, 33 beacons, 8 spindles, 7 winter spar buoys.....	31
Lake St. John, Ashuapmouchouan river, 30 balises.....	7	Ste. Anne river.....	1
Lake St. John, Mistassini river, 60 balises..	12	St. Godfroy.....	1
Lake St. John, Peribonka river and Roberval 35 balises.....	16	St. Michel de Bellechasse.....	4
Little River East.....	1	St. Thomas de Montmagny.....	8
Little River West.....	1	Saguenay river, vicinity of Chicoutimi.....	35

MONTREAL DISTRICT.

Ottawa River district.....	85	St. Francis river, 80 balises and 12 day beacons.....	
Richelieu rapids, bushes.....		St. Maurice river, Grandes Piles to Latuque, 106 day beacons.....	74
Richelieu river, above St. Johns.....	29	Yamachiche river, 30 balises and 4 day beacons.....	
Richelieu river, Sorel to Chambly.....	37	Yamaska river, 60 balises and 6 day beacons.....	
River St. Lawrence, 10 balises.....	288		
Riviere des Prairies.....	11		

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PRESCOTT DISTRICT.

Locality and number of stakes, etc.	No. of Buoys	Locality and number of stakes, bushes, etc.	No. of Buoys
Bay of Quinte.....	15	Murray canal and Presqu'ile bay.....	19
Kingston, lake Ontario.....	9	Napanee river.....	14
Lake Ontario, Melville shoal.....	1	Picton harbour, bay of Quinte.....	6
Lake Ontario, NE. of Snake island.....	1	River St. Lawrence, 4 beacons.....	81
Lake Ontario, SE. end of Snake island shoal.....	1	Telegraph narrows, bay of Quinte.....	8
Lake Ontario, SW. end of Snake island shoal.....	1	Trent canal (maintained for this Department by Department of Railways and Canals)	317
Lake Ontario, off Long point, Wolfe island...	1	Trenton, Bay of Quinte.....	13
Lake Ontario, E. of Presqu'ile light.....	1	Whitby, lake Ontario.....	5
Lake St. Francis.....	29		

PARRY SOUND DISTRICT.

Ann Long bank, Georgian bay.....	1	Mutton, island, lake Superior.....	1
Bar point, Georgian bay.....	1	Northeast shingle, Georgian bay.....	1
Bernard rock, Georgian bay.....	1	Owen Sound channel, Georgian bay.....	4
Blind river.....	6	Parry Sound channel, 2 beacons.....	20
Burke shoal, lake Superior.....	1	Parry Sound to Penetanguishene (Minnico- ganeshene channel).....	43
Byng inlet channel, Georgian bay, 6 beacons.....	27	Pembroke.....	29
Cache bay, lake Nipissing, 8 stakes.....		Penetanguishene.....	12
Campana shoal, Georgian bay.....	1	Point au Baril, 15 beacons.....	3
Campbell rock, Georgian bay.....	1	Port Arthur.....	17
Cape Hurd, lake Huron.....	3	Port McNicoll, Georgian bay.....	1
Clapperton channel, 1 beacon.....	8	Port Rowan.....	10
Cloud bay, lake Superior.....	2	Port Severn, Georgian bay.....	14
Collingwood.....	13	River St. Mary and southeastern part of lake Superior.....	32
Dawson rock, Georgian bay.....	1	River Thames.....	7
Detroit river.....	30	Rondeau.....	6
Fort William, lake Superior.....	15	St. Clair river, Chenal Ecarte.....	1
Goderich.....	7	St. Joseph channel, lake Huron, 1 beacon, 5 winter buoys.....	25
Grand reef, lake Superior.....	1	Shebeshekong channel, Georgian bay, 22 day beacons.....	
Honey harbour.....	15	Silver islet, lake Superior.....	2
Jackson shoal, Georgian bay.....	2	Southampton.....	7
Kennedy bank, Georgian bay.....	1	South Baymouth.....	4
Key harbour, Georgian bay, 6 beacons.....	24	Stokes bay.....	6
Killarney, Georgian bay.....	3	Sturgeon river, 20 stakes.....	16
Lake Couchiching and narrows, 11 bushes....	8	Victoria harbour, Georgian bay.....	1
Lake Simcoe.....	5	Victoria island, lake Superior.....	3
Lake Superior, southeastern part.....	7	Waubauskene.....	53
Lionshead harbour, Georgian bay.....	1	Wabuno channel, 2 beacons.....	5
Little Current.....	27	Wingfield basin, Georgian bay.....	4
Mary Ward ledges, Georgian bay.....	3		
Meaford, Georgian bay.....	3 A		
Michipicoten (Quebec harbour).....	6		
Midland, Georgian bay.....	3		
Morden rock, Georgian bay.....	1		

KENORA DISTRICT.

Maintained by Agency.....	365		
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MANITOBA DISTRICT.

Black river.....	6	Warrens Landing	12
Red river.....	7		

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BRITISH COLUMBIA DISTRICT.

Locality and number of stakes, bushes, etc.	No. of Buoys	Locality and number of stakes, bushes, etc.	No. of Buoys
Active pass, 1 beacon.....		Mud bay, Serpentine and Nicomeck'l rivers, 27 beacons.....	
Arrow lakes, uppper and lower.....	16	Nanaimo harbour and Departure bay, 1 beacon.....	14
Barkley sound, 1 dolphin.....	1	Observatory inlet, 1 beacon.....	3
Baynes sound, 1 beacon.....	10	Okisollo channel, 3 beacons.....	
Broughton strait.....	1	Pender island channel.....	2
Burrard inlet, 3 beacons.....	5	Pitt river.....	9
Chatham sound, 1 beacon.....	8	Porpoise harbour.....	6
Clayoquot sound, 5 beacons.....	15	Prevost channel.....	1
Colburne passage.....	2	Prince Rupert harbour, 1 beacon.....	2
Courtenay river, 12 dolphins.....		Queen Charlotte islands, 4 beacons.....	1
Esquimalt harbour, 1 beacon.....	4	Queen Charlotte sound, 2 beacons.....	
False narrows, Northumberland channel.....	2	Saanich inlet, 3 beacons.....	2
Finlayson channel, Grenville channel and connecting waters, 4 beacons.....	1	Satellite channel, 1 beacon.....	1
Fisher channel, Lama passage and Seaforth channel, 6 beacons.....	1	Shute passage.....	1
Fraser river.....	30	Sidney channel, 1 beacon.....	6
Ganges harbour.....	2	Skeena river, 5 beacons.....	2
Genoa bay, 1 beacon.....		Strait of Georgia, 3 beacons.....	7
Haro strait, 1 beacon.....	2	Strait of Juan de Fuca.....	1
Johnstone strait, 4 beacons.....	2	Stuart channel, 4 beacons, 1 dolphin.....	6
Kootenay lake, northwest arm.....	11	Sutil channel, 1 dolphin.....	2
Malaspina strait, 4 beacons.....	2	Trincomali channel, 5 beacons.....	3
Metlakatla harbour.....	4	Victoria harbour, 2 beacons.....	2

RIVER ST. LAWRENCE SHIP CHANNEL.

REPORT OF V. W. FORNERET, B.A.Sc., SUPERINTENDING ENGINEER.

GENERAL INFORMATION.

The ship channel of the river St. Lawrence between Montreal and Father Point, has a total length of 340 statute miles.

The contracted part of the river, which is properly called the "Ship Channel" commences at "The Traverse" to which point from Montreal, the distance is 220 miles.

This is divided into five divisions as follows:—

	Statute miles.
Division 1—Montreal to Sorel.....	45
" 2—Sorel to Batiscan (does not include Lake St. Peter).....	36
" 3—Lake St. Peter.....	20
" 4—Batiscan to Quebec.....	59
" 5—Quebec to the Traverse.....	60
Total.....	220

The dredging operations for the season of 1918 were very much reduced owing to war conditions, only five dredges and one rock cutter being put in commission, and these working only 10 hours per day.

With such a small plant, progress was naturally slower, and any extensive contemplated improvements had again to be postponed until conditions improved. Part of this plant had to be employed chiefly on the maintenance of the ship channel, above and below Quebec. Two dredges and one rock cutter were placed to work at Cap à la Roche deepening and widening the channel at that point, the material being solid shale rock.

There were also numerous boulders to be lifted with a stone lifter.

Notwithstanding the short season, short day, hard material, and very stiff current, considerable progress was made.

Semaphores.—The tidal semaphore at Cap à la Roche, which shows the available depth of water in the dredged channel at Cap à la Roche, was started working on May 8, 1918.

The tidal semaphore at Pointe Citrouille which also shows the water available in Cap à la Roche channel was put in operation on the same date. This semaphore enables the pilots of deep draught vessels outward bound to know if there is sufficient water in the channel at Cap à la Roche to allow them to pass safely. If they see that there is not sufficient depth, they can anchor just below Pointe Citrouille where there is a splendid anchorage ground, and wait for the tide to rise.

The tidal semaphore at St. Nicholas which shows the depth of water available over the undredged St. Augustin bar, was placed in operation on May 7, 1918.

Depth of water in channel season, 1918.—The depth of water in the ship channel during the whole season of 1918 was remarkably good, the lowest being 31 feet 3 inches, and this lasted only for a few days. This was most fortunate, at a time when every additional inch available was being taken advantage of to carry food to the Allies.

The depth of water was exceptionally high during the month of November, the average depth for that month being 34 feet 11 inches.

On November 21 the gauge read as high as 38 feet 1 inch; this was due to strong easterly gales which prevailed for several days.

The following are the averages of depth of water in the ship channel for the season of 1918, as per Sorel gauge:—

	Feet.	Inches.
May.....	36	1
June.....	34	1
July.....	33	10
August.....	32	
September.....	32	3
October.....	33	7
November.....	34	11

Accidents.—The season of 1918 was practically free from any serious accidents or marine casualties in the ship channel, although it was a record one for the number of vessels using it. This speaks well for the excellence of the Aids to Navigation, the Pilotage System, and to the maintenance and improvements to the channel.

Sweeping of the Channel.—The usual annual sweeping of the channel was done during the season of navigation, and no obstruction of a serious nature was found. Some sandbars were found to have formed in Champlain channel but these were removed before the low water season.

A large area was covered by the new sweeping steamer *Detector* between St. Jean (island of Orleans) and Longue Pointe below Cap Tourmente in the North channel below Quebec, and very valuable information was obtained for future dredging operations in that channel. The *Detector* has proved itself a most useful vessel, as the work of testing can be carried on with this steamer, in places exposed to the weather, where too much time would be lost if the old method of tug with scow was resorted to. All the machinery used in connection with the sweeping operations which is usually placed on a scow, and propelled by a tug, was installed on the steamer itself and the scow done away with.

DREDGING OPERATIONS DURING SEASON 1918.

Division I—Montreal to Sorel.

Longueuil Curve (Montreal Harbour).—Considerable work was done on this curve during the season of 1918, widening and deepening to 35 feet at E.L.W. of 1897. This curve is to be widened on the north side (Forsyth shoal) in order to obtain a width of 850 feet, which will be a great improvement for that part of the channel.

The material to be dredged is of a very hard nature, consisting of hardpan, some shale rock, stones and boulders. The total number of cubic yards removed amounted to 73,300.

Pointe aux Trembles Channel.—One dredge worked part of the season on this channel, which was nearly all completed to 35 feet at E.L.W. There is only 175 feet yet to be done. The total number of cubic yards dredged during the season of 1918 amounted to 32,400, the material consisting of shale rock and some clay.

Approach Channel to the Imperial Oil Co's Wharf, Pointe aux Trembles.—The Montreal Harbour Commissioners again applied for the use of an elevator dredge and necessary attending plant to complete the approach channel, as they did not have the proper plant to do the work. Their request was granted by the department.

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The dredging of this channel was finished in about a month to 28 feet at E.L.W., the material being stiff clay. The number of cubic yards removed being 17,400.

Varennés Curve.—Only one dredge was placed to work on the curve for about a month at the beginning of the season, deepening to 35 feet at E.L.W. The dredged material consisted of clay and the amount removed was 27,650 cubic yards.

Division II—Sorel to Batiscan (does not include Lake St. Peter).

Ile de Grace Channel.—Very little work was done on this channel, only one dredge operating for a short time deepening the channel to 35 feet at E.L.W. of 1897, the material being clay and the amount of dredging being 11,900 cubic yards.

Becancour Traverse.—The axis of the centre line of Becancour traverse, had to be shifted a little to the north on account of the new buildings erected by the St. Maurice Paper Mills Company having obscured the High light. In order to do this and not reduce the width of the channel, it was found necessary to remove two small shoals at the upper end of the traverse, north of the North bank line. One of the dredges was detailed to this work, which occupied only a few days. The material consisted of clay and stones and amounted to 2,210 cubic yards. The removal of these shoals also created a very good “anchorage ground” at the upper end of the traverse.

Champlain Channel.—This channel was thoroughly swept by the sweeping steamer early in the season and some sandbars were found to have formed between Pointe Citrouille and upper end of Champlain channel. One dredge was detailed to remove these and was occupied on this work most of the season. This is the only point where filling of any importance occurs in the ship channel between Montreal and Quebec. The number of cubic yards removed amounted to 55,300.

Division III (Lake St. Peter).

No dredging operations were carried out in this division during the season of 1918.

Division IV—Batiscan to Quebec.

Cap à la Roche Curve.—Two powerful rock dredges, one rock cutter, one stone lifter and attending plant were employed all season on this important part of the ship channel. The material to be dredged is of an exceedingly hard nature, being solid shale rock, which has to be broken by the rock cutter before being removed. The rock appears to get harder the deeper the dredging. There are also many large boulders to be lifted by the stone lifter. In addition, there is a very strong current at ebb tides to contend with, which helps to make progress slower than in other parts of the ship channel. Notwithstanding all this, good progress was made during last season, the widening on the north side of the channel having been completed to 30 feet at E.L.W.

It is proposed to give the full advantage of this increased width to vessels early next season. This was all thoroughly and carefully tested with the testing scow late last Autumn to 27½ feet at O.L.W. as it is the intention to open the increased width to that depth only being the present available depth in the unfinished parts of the curve. Only a couple of small touchings were found, which will be removed early next season with a stone lifter. The channel will then be again carefully swept and if it proves clear, the buoys will be re-arranged to mark the increased width in the upper part of the curve. It is proposed to place three additional gas buoys, which will be of great assistance to make this part of the ship channel much safer for night navigation.

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The total number of cubic yards removed during the season of 1918 amounted to 105,190. In addition to this there is a considerable area broken up by the rock cutter in readiness for the dredges to commence work next season.

Division V—Quebec to "The Traverse".

North Channel.—The powerful hydraulic dredge No. 8 was employed during the first half of the season, dredging at East Narrows to 35 feet at extreme low tide, the material being sand, stones and some clay. The number of cubic yards removed being 211,360.

South Channel.—As some filling was found to have taken place in the St. Thomas channel since the dredging was completed in 1912, it was decided to place dredge No. 8 to commence cleaning this up. No. 8 was taken over to St. Thomas bank on July 19, and continued working there until the end of the season. The material was soft clay (silt) and the number of cubic yards removed amounted to 98,300.

The total cost from 1851 to the end of the fiscal year March 31, 1919, of the ship channel from Montreal to Father Point, including plant, shops, surveys, etc., is as follows:—

Dredging.....	\$ 14,518,067 05
Plant, shops, surveys, etc.....	8,187,420 44
Total.....	\$ 22,705,487 49

The total number of cubic yards removed amounted to 116,935,833, the material varying from very hard shale rock to soft blue clay.

ACCIDENTS.

Very few accidents occurred on the River St. Lawrence ship channel between Montreal and Father Point during the season of 1918, and none of these could be attributed to any fault of the ship channel.

Montreal to Quebec.

June 10.—SS. *Valdura* grounded in Montreal harbour, 1 mile above Longue Pointe signal station, was refloated same day, apparently no damage.

July 10.—Schooner *M. P. Connolly*, in tow, when turning above Three Rivers, went ashore, was pulled off same day. No damage.

September 15.—Steam barge *T. P. Phelan* went aground at Ile Hartelle, but was refloated, apparently undamaged.

September 18.—SS. *Hemslock* went aground at Ile Hartell, was refloated.

September 21.—SS. *Troja*, outward bound, collided with SS. *Berrima*, 2 miles below Pointe Citrouille, both vessels damaged. SS. *Troja* had to be beached, but was refloated and taken to Quebec to go into drydock for repairs.

October 10.—Steam barge *Cobotia*, grounded 1 mile east of Pointe Citrouille, was refloated.

October 21.—Steamer *Polaris* went aground off outside Contrecoeur traverse, was refloated.

Quebec to Father Point.

May 8.—SS. *Lycaon* went aground at cape Dog, was refloated.

July 5.—SS. *Celtic Prince* went aground on Barnaby island, was refloated and came to Quebec under her own steam, and placed in drydock at Levis for repairs.

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July 25.—Steam barge *Senator Derbyshire* went aground on Bic island, was refloated.
July 27.—Steam barge *Compton* went aground on Red island, was refloated.
December 8.—SS. *War Matane* went aground on Ste. Marguerite island, was refloated.

MARINE SIGNAL SERVICE.

Signal stations have been established for the purpose of maintaining communication between ship and shore by means of flag signals.

This system of stations extends from St. John, N.B., Halifax, N.S., Cape Race, Nfld., and Belle Isle up the gulf and river St. Lawrence and through the Great Lakes to Sault Ste. Marie, Ont.

Following is a complete list of stations:—

EAST OF QUEBEC.

Name of Station.	Location.	Nautical Miles from Quebec.	Means of Communication.
R Quebec.....	Custom House.....	0	Telephone.
X St. Jean d'Orleans.....	Shore end of wharf.....	14	"
Crane Island.....	Lighthouse.....	32	"
L'Islet.....	100 yards east of church..	40	Telegraph.
Cape Salmon.....	Lighthouse.....	81	Telegraph and Telephone
Riviere du Loup.....	Shore end of wharf.....	92	Telegraph.
Father Point.....	"	157	"
Little Metis.....	Lighthouse.....	175	"
Matane.....	"	200	"
Pointe des Monts.....	"	219	"
Cap Chat.....	"	234	"
Riviere à la Martre.....	"	260	"
Cape Magdalen.....	"	294	"
F Fame Point.....	"	325	"
Cap des Rosiers.....	"	349	"
Cap d'Espoir.....	"	377	"
Point Maquereau.....	"	400	"
West Point, Anticosti.....	"	332	"
Southwest Point, Anticosti.....	"	360	"
South Point, Anticosti.....	"	415	"
F Heath Point, Anticosti.....	"	438	"
Point Escuminac, N.B.....	"	462	"
Amherst Island, Magdalen Islands.....	"	481	"
St. Paul's Island, C.B.....	Main Station.....	540	Telephone.
F Money Point, C.B., N.S.....	Lighthouse.....	537	"
F Flat Point, N. S.....	"	575	Telegraph.
F Cape Ray, Nfld.....	"	553	"
Cape Race, Nfld.....	"	826	"
F Point Amour.....	"	673	Wireless Telegraph.
F Belle Isle.....	"	734	"
Camperdown, N.S.....	Near Wireless Station.....	—	Telephone.
Halifax, N.S.....	The Citadel.....	—	"
Brier Island, N.S.....	Near Lighthouse.....	—	"
Point Lepreau, N.S.....	Lighthouse.....	—	"
Partridge Island, N.B.....	"	—	"
St. John, N.B.....	Custom House.....	—	"
Point Tupper, C.B., N.S.....	Lighthouse (Gut of Canso)	—	"
Scatari Island, N.S.....	Lighthouse (east end).....	—	"

WEST OF QUEBEC.

Bridge Station.....	½ mile above Quebec.....	0	Telephone.
	Bridge on south shore...	6	"
St. Nicholas.....	At Tidal Semaphore.....	12	"
Portneuf.....	In front lighthouse.....	31	"
Grondines.....	In old windmill tower.....	41	"
St. Jean Deschaillons.....	At Tidal Semaphore.....	45	"

WEST OF QUEBEC—Concluded.

Name of Station.	Location.	Nautical Miles from Quebec.	Means of Communication.
Pointe Citrouille.....	Lighthouse.....	55	Telephone.
Three Rivers.	Upper end of Bureau wharf	68	"
Sorel.....	Middle of Government wharf, facing the St. Lawrence river.....	100	"
Bellmouth....	About 500 feet east of Contrecoeur Lower Range Low Light.....	110	"
Cap St. Michel.....	On extreme point of Cap St. Michel.....	125	"
Longue Pointe.....	Short distance below Presbytery.....	134	"
R Montreal.....	La Sauvegarde Pldg., 92 Notre Dame St. (E.)...	139	"

WEST OF MONTREAL.

		Nautical Miles from Montreal.	
R Lachine Canal.....	Lock No. 2.....	0	Telephone.
R Lachine Canal.....	Lachine.....	8	"
R Soulanges Canal.....	Cascades Point.....	21	"
R Soulanges Canal.....	Coteau Landing.....	33	"
R Cornwall Canal.....	Cornwall.....	62	"
R Cornwall Canal.....	Dickinson's Landing.. .	72	"
R Galops Canal.....	Lift Lock.....	99	Telegraph.
R Welland Canal.....	Port Dalhousie.....	298	"
R Soo Canal.....	Sault Ste. Marie, Ont.....	820	"

Stations marked " R " are reporting stations only, and are not equipped for signalling purposes. Stations marked " X " closed during the period of the war. Stations marked " F " are equipped with flash lights for night signalling.

On account of the large quantity of high explosives that was being shipped from the port of Montreal during the season of 1918 it was deemed expedient to provide for the identification and safeguarding of ships carrying such explosives while navigating the River St. Lawrence ship channel. Therefore, special day and night signals were provided and displayed at the different signal stations, between Montreal and Crane island, to advise and warn vessels as to the movements of ships loaded with high explosives during their passage between the two above points. This was most successful, and no accidents occurred.

All buildings and signal masts belonging to the different signal stations were maintained in good order.

ICE-BREAKING, 1918-19.

Report of N. B. McLean, Resident Engineer. -

The winter of 1918-19 was extremely mild throughout The ice bridge formed at the foot of lake St. Peter on December 18th, and from this point to the sea, the river remained open. Very little work was done by the ice-breakers stationed at Quebec, occasionally one of these vessel came up and broke large drifting fields of ice, or sliced battures that were extending too

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far. Less difficulty was experienced this year than at any other time since ice-breaking operations were undertaken.

On December 3, the *Lady Grey* took up her station at Three Rivers to keep Port St. Francis open and to aid vessels coming down. Instructions were received December 4 to go to Montreal and tow down the C.G.S. *Canadian Pioneer* to Quebec, in order that this vessel might be completed there. The *Lady Grey* arrived at Montreal December 5, left the next day with the *Canadian Pioneer* in tow, assisted by the wrecking steamer *Lord Strathcona* and the tug *Sir Hugh Allan*, but only went as far as Sorel, as it was too late to pass the Lake before dark. On December 7 Three Rivers was reached, but further progress was prevented by snow. Some difficulty was experienced at Port St. Francis, as the ice was blocked there, and several vessels were caught; but the *Lady Grey* quickly broke up the jam, and all the ships came through safely. The convoy remained at Three Rivers December 8, as there was a heavy snow storm. The next morning, December 9, the weather was clear, and the *Lady Grey* proceeded down with her tow, arriving at Quebec at 6 p.m. The ice at Quebec bridge, and above for about a mile was heavily packed. It was impossible to manoeuvre at all, and the vessels had to drift through, luckily all passed down safely.

The *Lady Grey* returned to Three Rivers on December 10. The weather turned mild and there was very little ice, the vessels coming through without any trouble. On December 17 all ships outward bound were reported as having passed down, and the *Lady Grey* returned to Quebec to take up her winter station.

Two ships were escorted outwards from Quebec by the ice-breakers during the winter. The first of these, the SS. *Flagg* was accompanied by the *Lady Grey* as far as Tadousac on December 26. From this point she proceeded alone, and the *Lady Grey* returned to Quebec December 27.

The *Canadian Voyageur*, the first of the new Canadian Government steamers to go to sea, left Quebec January 21, escorted by the *Montcalm*, and reached Sydney February 2, taking twelve days to make the trip. The route followed was on the north side of Anticosti, it being generally conceded that vessels have a better chance of getting through this way than by going by the south, where it is known that the ice is always more or less packed. In spite of the fact that these vessels took the best known channel, and that the winter was exceptionally mild, a great deal of difficulty was experienced getting through from Portneuf on the north shore to the eastern end of the island of Anticosti. The ships were at one time carried 45 miles to the westward, were frequently stuck in the ice unable to make any progress, and finally were caught in heavy packed ice from January 27 until February 1, when the pack loosened and they were able to proceed to Sydney. The *Montcalm* had her rudder damaged and two propeller blades broken.

Considering that the conditions were as favourable as they are ever likely to be, it does not appear from this experience, that winter navigation as a commercial proposition would be a success.

After arriving at Sydney, it was found that the *Montcalm* would have to be docked to have the propellers and rudder overhauled. She proceeded to Halifax where the necessary repairs were made.

On the return trip from Sydney, the *Montcalm* left the latter place on March 11 with freight and passengers for the North shore. She made a number of stops, being delayed at one or two points on account of unfavourable weather for landing, and finally reached Quebec on March 18, the whole trip, including stops, taking only seven days. No ice of any consequence was encountered.

On March 15 the *Lady Grey* came up from Quebec and began the work of breaking up the ice in lake St. Peter and the river above. At this date the head of the open water was two miles above the upper end of No. 3 curve. This vessel worked alone until March 24, when she was joined by the *Montcalm*

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which arrived from Quebec on March 23 to aid in the operations. By March 27 a channel had been cut through lake St. Peter and as far up as the head of Stone island.

On the morning of March 28 the *Montcalm* was engaged widening at the lower end of the lake, and the *Lady Grey* was proceeding to the head of the cut to continue working up stream. When she was slightly above the upper end of Ile aux Raisins traverse the whole body of the lake ice broke away, and began to move down. Luckily the *Lady Grey* was practically abreast of the break, and was able to get clear above it, but there was no way to get back, as the channel behind was closed almost immediately. She proceeded up to the head of the cut and took shelter at mouth of the Chenal aux Corbeaux. It was not considered advisable to make the attempt to cut her way to Sorel, as the ice above was very heavy, and it was feared that her coal would run out before she reached there. Nothing could be done but remain in shelter until the *Montcalm* cleared the lake.

After the ice moved in the lake conditions generally were very bad, the weather turned cold again, with a great deal of snow and thick weather. Usually when a channel has been cut through lake St. Peter the south half of the ice moves out first, followed by the north half, and the icebreakers can keep it moving without much difficulty, but this year the whole mass of the ice moved at once, which caused many jams at the foot of the lake, and the *Montcalm* had a great deal of hard work breaking them up. To make matters worse her rudder was again damaged, and for a number of days she had to work without it, using her propellers for steering purposes, which made her very much slower in manoeuvring. Owing to these adverse conditions it was not until April 15 that the lake was finally clear of ice. The *Lady Grey* made her way to Sorel on April 14, as the upper part of the river cleared a day before the lake. On April 15 the river was reported clear to Montreal, that is to say that there were no jams anywhere, but much running ice between Three Rivers and Quebec. This completed the work between Montreal and Quebec.

At the request of the Department of Railways and canals the *Lady Grey* was sent up to the foot of the Soulanges canal to clear the channel of ice so as to allow vessels to pass up and down. She left Sorel April 17, proceeded to Montreal, passed the night there, went to Lachine the next day, remaining over night, going on to the Soulanges canal on the morning of the 18th. She cleared the ice from the canal entrance which required only about an hour's work, and was back in Montreal the same evening. This completed the ice-breaking operations.

Average depth for each month in the 27½ foot channel (27½ feet at ordinary low water) from Sorel Gauge during each year, May to November.

Year.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Highest	Lowest
	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.
1892.....	31 0	31 9	31 6	30 6	28 9	28 3	28 3	33 6	27 3
1893.....	36 0	34 3	30 9	29 9	29 6	28 6	28 0	37 6	27 6
1894.....	34 6	31 9	31 0	29 2	28 3	28 9	29 0	36 0	27 7
1895.....	33 3	31 3	28 3	28 3	7 6	26 9	26 9	34 6	25 10
1896.....	33 6	30 6	28 9	28 0	27 6	27 9	29 0	37 0	27 4
1897.....	35 6	32 6	30 3	29 3	28 0	27 0	27 6	37 0	26 5
1898.....	31 6	39 9	29 8	28 2	28 2	28 3	28 6	31 1	26 9
1899.....	36 2	31 9	30 3	28 6	27 6	28 0	27 9	37 9	26 9
1900.....	33 6	30 9	30 6	29 6	28 1	28 9	29 2	35 9	27 4
1901.....	34 3	31 10	29 2	28 3	27 1	27 4	27 3	36 3	26 6
1902.....	32 2	32 2	32 2	29 4	28 1	28 1	29 0	34 1	27 6
1903.....	33 0	30 11	30 5	29 5	28 4	29 0	27 11	32 8	26 11
1904.....	36 3	34 5	30 9	29 5	29 5	30 4	29 3	37 4	28 1
1905.....	31 10	30 8	29 7	29 0	28 0	28 5	28 1	33 6	27 1
1906.....	32 4	31 5	29 3	27 11	27 3	27 4	27 6	33 3	26 9

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Average depth for each month in the 30 foot channel (30 feet at extreme low water of 1897.)

1907.....	37 1	35 9	34 3	32 10	32 4	32 9	33 7	38 3	31 10
1908.....	41 5	37 10	33 10	32 10	32 0	31 0	30 6	42 4	30 0
1909.....	40 6	37 6	33 10	32 2	32 7	32 4	31 6	42 7	30 11
1910.....	35 7	34 5	32 3	31 7	31 6	31 6	31 7	37 1	30 7
1911.....	36 6	34 6	32 1	31 3	30 9	30 2	30 3	38 1	29 4
1912.....	37 9	37 6	33 6	32 8	32 6	32 6	34 9	40 11	31 3
1913.....	37 0	34 4	32 8	31 10	31 6	32 1	32 7	38 6	31 1
1914.....	35 2	33 0	32 4	31 4	31 3	30 11	31 0	36 10	30 3
1915.....	34 7	32 6	31 6	31 4	31 1	30 11	30 8	37 4	30 1
1916.....	38 9	37 2	34 0	32 5	31 7	31 9	31 10	40 0	30 9
1917.....	36 8	36 6	34 10	33 6	32 3	32 6	33 0	38 2	31 3
1918.....	36 1	34 1	33 10	32 0	32 3	33 7	34 11	38 1	31 3

COST OF SHIP CHANNEL TO DATE—TABLE SHOWING THE TOTAL COST OF THE DREDGING AND PLANT AND THE QUANTITIES DREGDED TO MARCH 31, 1919.

	Cost Dredging.	Expenditure for plant, shops, surveys, etc.	Quantities Dredged.
	\$ cts.	\$ cts.	Cu. Yds.
MONTREAL HARBOUR COMMISSIONERS, 1851 to 1888.			
Dredging Montreal to Cap a la Roche to 27½ feet at O.L.W., and from Cap a la Roche to Quebec to 27½ feet at half tide.....	3,402,494 35	534,809 65	19,865 693
DEPARTMENT OF PUBLIC WORKS.			
Dredging, consisting of widening and cleaning up of channel, deepening Cap a la Roche to Cap Charles to 27½ feet at O.L.W., and dredging at Grondines, Lotbiniere and Ste. Croix, 1889 to June 30, 1899...	829,583 08	486,971 79	3,558,733
PROJECT OF 1899.			
Dredging channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet and straightening—			
Fiscal Year, 1899-1900.....	100,191 01	265,270 78	1,107,894
" 1900-1901.....	136,680 83	287,040 04	2,479,385
" 1901-1902.....	185,429 80	479,731 47	3,098 350
" 1902-1903.....	255,776 55	277,703 50	6,544,605
" 1903-1904.....	276,958 59	308,765 44	4,619,260
DEPARTMENT OF MARINE AND FISHERIES. <i>This includes the work below Quebec.</i>			
Quebec—			
Fiscal Year, 1904-1905.....	311,087 93	277,225 69	2,716,220
" 1905-1906.....	431,768 30	317,327 37	4,047,530
" 1906-1907..... (July 1, 1906 to March 31, 1907).	302,677 37	275,003 61	3,001,010
Fiscal Year, 1907-1908.....	478,209 66	417,390 22	4,831,875
" 1908-1909.....	497,686 03	340,861 86	5,896,737
" 1909-1910.....	572,950 71	321,375 80	6,354,285
" 1910-1911.....	576,838 02	488,248 88	5,600,050
" 1911-1912.....	588,697 60	499,799 58	4,509,904
" 1912-1913.....	663,229 74	430,107 86	6,929,344
" 1913-1914.....	895,235 59	426,018 12	6,140,867
" 1914-1915.....	1,036,846 65	327,975 71	6,225,143
" 1915-1916.....	976,622 03	771,760 03	8,462,957
" 1916-1917.....	1,030,550 60	437,469 62	7,800,555
" 1917-1918.....	618,399 69	136,765 97	2,517,376
" 1918-1919.....	350,152 92	79,797 45	628,060
	14,518,067 05	8,187,420 44	116,935,833

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DREDGING OPERATIONS.

Progress of dredging operations at the close of the season 1918, 30-foot project.

Locality.	Distance, English miles.	Total length requiring dredging.	Length dredged in 1918.	Total length of 30-foot channel dredged.	Length yet to be dredged.
		Miles.	Miles.	Miles.	Miles.
Division 1:— Montreal to Sorel.....	45	22.90		22.90	All completed.
Division 2:— Sorel to Batiscan.....	36	12.45		12.45	All completed.
Division 3:— Lake St. Peter.....	20	18.00		* 0.50 †17.50	
Division 4:— Batiscan to Quebec.....	59	10.00	0.10	8.36	1.64
Division 5:— Quebec to the Traverse.....	60	4.65		4.65	
Total.....	220	68.00	0.10	66.36	1.64

*Not widened.. †Widened.

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Progress of the dredging operations at the close of the season of 1918, 30-foot project.

Locality.	Length of Dredging.		Cubic Yards yet required to be done.
	Required.	Done.	
	Miles.	Miles.	
Division 1—			
Longueuil Shoal.....		1.10	
Longue Pte. to Pte. aux trembles (E.H.).....		5.05	
Ile Ste. Therese.....		0.40	
Varennes to Cap St. Michel.....		3.00	
Cap St. Michel to Vercheres.....		4.50	
Vercheres Traverse.....		1.10	
Vercheres to Contrecoeur.....		1.70	
Contrecoeur Channel.....		6.05	
Total.....		22.90	
Division 2—			
Sorel to Ile de Grace.....		4.40	
Stone Island.....		1.10	
Ile aux Raisins.....		0.25	
Lake St. Peter (See Division 3).....			
Port St. Francis.....		0.50	
Three Rivers.....		0.50	
Cap Magdeleine to Becancour.....		1.55	
Becancour to Champlain.....		2.25	
Champlain to Pte. Citrouille.....		1.30	
Batture Perron.....		0.60	
Total.....		12.45	
Division 3—			
Lake St. Peter.....		* 0.50 †17.50	200,000
Total.....		18.00	200,000
Division 4—			
Batiscan to Cap Levrard.....		5.00	
Cap a la Roche channel.....	0.44	1.56	89,810
Pouillier Rayer.....		1.20	
Cap Charles.....		0.90	
Grondines.....		0.80	
Lotbiniere.....		0.40	
Cap Sante.....		0.20	
Ste. Croix.....	0.60	0.30	300,000
St. Augustin.....	0.60		500,000
Total.....	1.64	8.36	889,810
Division 5—			
Quebec to the Traverse.....		4.65	
Totals.....	1.64	66.36	1,089,810

*Not widened. †Widened.

Progress of dredging operations at the close of the season of 1918, 35-foot-project.

Locality.	Distance, English miles.	Total length requiring dredging.	Length dredged in 1918.	Total length of 35-foot channel dredged.	Length yet to be dredged.
		Miles.	Miles.	Miles.	Miles.
Division 1— Montreal to Sorel.....	45	28.63	0.77	16.80	11.83
Division 2— Sorel to Batiscan.....	36	19.75	0.01	6.10	13.65
Division 3— Lake St. Peter.....	20	18.32	.....	17.03	1.29
Division 4— Batiscan to Quebec.....	59	15.54	.....	.....	15.54
Division 5— Quebec to Goose Cape (North channel).....	66	8.14	0.75	7.39
Total.....	226	90.38	0.78	40.68	49.70

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Progress of the dredging operations at the close of the season of 1918, 35-foot project.

Locality.	Length of Dredging in Miles.		Cubic yards yet to be dredged.	Cubic yards dredged.
	Yet to be done.	Done.		
Division 1—				
Longueuil shoal.....	1.88		646,154	75,300
Longue Pte. traverse.....	0.39	0.08	443,592	51,550
Longue Pte. curve.....	1.24	0.08	991,531	242,350
Pte. aux Trembles channel.....	0.05	3.02	565,152	1,223,475
Ile Ste. Therese channel.....	1.12		146,611	
Varennnes curve.....	0.47	1.67	646,746	2,243,860
Cap St. Michel curve.....	1.00		500,500	
Cap St. Michel to Vercheres.....	0.25	4.47	140,233	1,913,350
Vercheres traverse.....	1.10	0.14	281,789	28,875
Vercheres to Contrecoeur.....	1.23	0.68	816,225	554,200
Contrecoeur channel.....	2.31	5.97	2,038,532	3,574,343
Lanoraie to Sorel.....	0.61		159,215	
Total Division 1.....	11.65	16.11	7,376,280	9,907,303
Division 2—				
Sorel to Ile de Grace.....	1.00	3.98	933,706	2,776,354
Stone island.....	1.42	0.69	466,370	414,890
Ile aux Raisins.....	0.99	1.10	202,125	777,224
Port St. Francis.....	0.67	0.35	491,303	248,275
Three Rivers.....	0.72		533,192	
Cap Magdeleine to Becancour.....	2.40		1,348,578	
Becancour to Champlain.....	1.16		932,750	
Champlain to Pte. Citrouille.....	4.06		2,632,356	
Batture Perron.....	1.23		684,600	
Total Division 2.....	13.65	6.10	8,224,980	4,216,743
Division 3—				
Lake St. Peter.....	1.29	17.03	1,161,570	11,335,582
Division 4—				
Batiscan to Cap Levrard.....	4.48		2,386,168	
Cap Levrard channel.....	1.27		781,666	
Cap a la Roche curve.....	2.06		1,836,859	
Cap Charles channel.....	2.04		1,077,416	
Grondines.....	0.83		513,332	
Lotbiniere.....	0.47		321,480	
Cap Sante.....	1.51		655,561	
Ste. Croix.....	1.47		798,518	
St. Augustin.....	1.41		826,207	
Total Division 4.....	15.54		9,197,207	
Division 5—				
Quebec to Goose Cape (North channel).....				
Madame Reef shoal.....	2.84		2,585,132	
West Sand and east narrows shoals.....	4.55	0.75	1,394,313	12,173,728
Totals Division 5.....	7.39		3,979,445	12,173,728
Totals.....	49.52	39.99	29,939,482	37,633,356

ABSTRACT of Work of Dredging Fleet during Fiscal Year ended March 31, 1919:

Dredge.	Locality of Dredging.	Time of Service.	Working hours, 24 per day.	Hours actual dredging.	Number of scows filled.	Cubic yards dredged scow measurement.	Depth of dredging at low water.	Width in feet.	Character of Soil.	Remarks.
<i>Laval</i> (No. 1).....	Ile de Grace channel.. Cap a la Roche curve.	Days. 14	Hours. 140	76½	49	11,950	Ft. In. 35 0	Feet. 450	Clay..... Shale rock.....	Capt. J. Baron.
		40	400	187½	115	27,750	30 0	450 to 550		
		54	540	264	164	39,700				
<i>Laurier</i> No. 2).....	Vareennes curve..... Champlain channel....	27	270	171½	158	27,650	35 0	550 to 600	Clay..... Sand (cleaning up).	Capt. R. Matte.
		110	1,100	729½	273	55,300	30 0	450		
		137	1,370	901	431	82,950				
<i>Lady Aberdeen</i> (No. 3).....	Pte. aux Trembles Channel..... Longueuil shoal.....	25	250	211	119	23,400	35 0	450	Shale rock and clay Hard pan and some shale rock. Clay.	Capt. N. Baron.
		90	900	729	293	57,300	35 0	200		
		26	260	166	82	17,400	28 0	400		
<i>Lafontaine</i> (No. 5).....	Longueuil shoal..... Becancourt traverse... Cap a la Roche curve.	141	1,410	1,106	494	98,100			Stones, boulders and shale rock..... Clay and stones. Shale and rock.	Capt. P. Bibeau.
		30	290	223½	100	18,000	35 0	200		
		14	140	92	8	2,210	30 0	150		
<i>Beaujeu</i> (No. 8).....	North channel, east narrows..... St. Thomas, bank, south channel.....	101	1,010	595	439	77,440	30 0	450 to 550	Sand, gravel, clay and stones..... Clay and stones (clean- ing up).	Capt. A. Bourget.
		145	1,440	910½	547	97,650				
		45	660	473	146	211,360	35 0	1,000		
		79	774	588½	65	98,300	30 0	1,000		
		124	1,434	1,061½	211	309,660				
						628,060				

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SOREL SHIPYARD.

REPORT OF SUPERINTENDENT W. S. JACKSON.

At the commencement of the fiscal year April 1, 1918, the winter repairs and renewals to the St. Lawrence Ship Channel fleet and the Construction of Lights Department vessels were nearly all completed and the outfitting in progress, engaging of crews for the new season's work, etc.

The Richelieu river was clear of ice on April 7, 1918, and the St. Lawrence at Sorel, on April 14.

The first dredge of the first fleet went into commission from Sorel on the 1st May, 1918.

During the season vessels were all maintained in a good and serviceable condition, and the necessary repairs carried out without undue detention to the working of the vessels.

The principal construction carried out by the Shipyard was as follows:—

NEW CONSTRUCTION.

Single-screw steel trawlers, yard Nos. 70 and 71 (Lot A. B. C. Tr. 33, 34). for the Director of Ship Construction, Montreal.

The hulls, engines, and boilers of both ships were made in shipyard.

No. 33 was completed in December, 1917, but owing to early ice, was held in Sorel.

No. 34, also a 1917 construction, was finished in the fall of that year, with the exception of the boiler, material for the same not being delivered, the vessel had to winter in Sorel. In the spring of 1918 both ships left, after satisfactory steam trials on the 26th May and the 26th June, respectively.

Three single-screw steel trawlers, yard Nos. 75, 76, and 77 (Lot B. Tr. 51, 52, and 53), for the Director of Ship Construction, Montreal.

The hulls were all constructed at this shipyard, and engines for No. 52 and 53, the engine for No. 51 was supplied by the Sorel Mechanical Shop, and the boiler by the Dominion Bridge Company.

Nos. 52 and 53 received boilers from the Canadian Allis Chalmers, Toronto.

Nos. 51 and 52 were completed and had satisfactory steam trials prior to leaving this yard for Quebec on the 20th November and 4th December, 1918, respectively.

No. 53 wintered in Sorel, when she was completed and ran satisfactory steam trials on April 19, 1919. She now remains in our charge awaiting further orders from the Director of Ship Construction.

A steel derrick of 8-ton lifting capacity for C.G.S. *Concretia*, was contracted for on February 6, 1919, and completed at this yard 15th March, 1919. All of steel, including latticed booms, and weighing net 4.16 tons.

BUOYS.

During the fiscal year 1918-19 we have constructed and shipped to various destinations, nineteen buoys of different designs, beside supplying to the buoy service in general fittings and material, such as anchors, rods, shackles, slings and chains, hooks, chisels, etc., during the season. Repairs were also made to winter buoys.

NAVAL SERVICE DEPARTMENT.

A considerable amount of work was done in the way of completing the hulls, cabin work, machinery, electric installation, piping, painting, etc., on trawlers Nos. 8 and 23, and others.

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ST. LAWRENCE SHIP CHANNEL.

Work was done for this branch such as making and repairing gauge boards, iron posts and caps, and supplying timber, etc., also necessary repairs to the yacht *Yinkin* and catamarans.

PRIVATE FIRMS.

United States Shipping Board.—The following vessels were hauled out on the ways for repairs:—

Tug *J. B Saunders* on May 9, launched May 20.

Tug *Kentucky*, on May 2, launched May 4.

Sincennes McNaughton Line.—The tug *Felicia R* was hauled out on the ways on August 6 for repairs, and launched on August 9. The *Alaska* was hauled out on April 24, and launched April 30.

This firm has also the use of shear legs several times during the season. Some welding was also done to boilers of tugs.

The barge *Reliance*, belonging to J. G Morgan, Esq., was hauled out on the ways on November 21 for repairs, and launched on November 29.

Canadian Vickers, Ltd.—Construction of two marine boilers 15 feet 6 inches diameter, including boiler mountings, smoke box, and Howdens forced draught, etc. Dredge No. 16, pumping, clearing snow, tuning main engine by hand, and watching.

GENERAL.

The shipyard launches *Bronx* and *Leros* were maintained in good order and painted.

All the fences were kept in good order and whitewashed during the season.

The shipyard ways and wharves were repaired and kept in good condition.

The force employed during the fiscal year averaged 642 men daily.

The financial statement shows the total amount expended in the shipyard and Ship Channel to have been \$496,245.44.

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EXPENDITURE AND REVENUE.

Statement of Expenditure and Revenue, Marine Department, 1918-19:—

Service.	Appropriation.	Expenditure.	Balance.
Ocean and river service—	\$ cts.	\$ cts.	\$ cts.
Dominion steamers.....	1,500,000 00	1,193,370 89	306,629 11
Examination of masters and mates.....	16,500 00	12,921 26	3,578 74
Investigation into wrecks.....	12,300 00	8,947 97	3,352 03
Removal of obstructions.....	5,000 00	93 50	4,906 50
Registration of shipping.....	3,000 00	3,018 31	.....
Expenses of schools of navigation.....	8,000 00	5,120 62	2,879 38
Cattle inspection.....	3,000 00	2,319 72	680 28
Subsidy to wrecking plant.....	35,000 00	35,000 00	.....
Unforeseen expenses.....	5,000 00	1,401 09	3,598 91
Boilers for SS. <i>Montcalm</i>	60,000 00	.....	60,000 00
Two steamers for Maritime.....	300,000 00	102,655 93	197,344 07
	1,947,800 00	1,364,849 29	582,969 02
Overdraft.....	.....	.....	18 31
			582,950 71
Public Works—			
Ship channel.....	478,000 00	425,332 57	52,667 43
Dredging plant.....	163,900 00	70,912 87	92,987 13
Six salt water tugs.....	50,000 00	46,528 85	3,471 15
	691,900 00	542,774 29	149,125 71
Lighthouse and Coast Service—			
Agencies, rents and contingencies.....	178,000 00	171,270 21	6,729 79
Salaries.....	540,000 00	519,102 53	20,897 47
Maintenance and repairs to lighthouses	700,000 00	668,050 16	31,949 84
Construction of Lighthouses.....	400,000 00	349,290 65	50,709 35
Administration of pilotage.....	176,300 00	91,076 75	85,223 25
Repairs to wharves.....	10,000 00	7,687 50	2,312 50
Repairs to Maritime roads.....	.....	.....	.....
Pensions to pilots.....	11,293 55	10,618 55	675 00
Telephones <i>re</i> aids to navigation.....	500 00	.....	500 00
Breaking ice.....	40,000 00	39,514 64	845 36
Allowance to Harbour Master at Amherstburg....	400 00	400 00	.....
Allowance to Lewis King.....	.....	.....	.....
Signal service.....	60,000 00	54,235 90	5,764 10
Repairing <i>Montmagny</i>.....	.....	.....	.....
New L. H. and Buoy Str. <i>Maisonneuve</i>.....	.....	.....	.....
	2,116,493 55	1,911,246 89	205,246 66
Miscellaneous—			
Compassionate allowance to dependents of SS. <i>Simcoe</i>	61,500 00	61,500 00	.....
Honorarium to J. T. Rowan.....	350 00	350 00	.....
	61,850 00	61,850 00	.....
Scientific Institutions—			
Meteorological service.....	200,000 00	188,187 74	11,812 26
Marine Hospitals and Distressed Seamen—			
Marine hospitals.....	75,000 00	73,291 17	1,708 83
Distressed seamen.....	3,000 00	1,000 19	1,999 81
Seamen's hospital fund.....	.....	.....	.....
	78,000 00	74,291 36	3,708 64
Steamboat inspection—			
Steamboat inspection.....	79,221 00	72,873 53	6,347 47
Civil Government salaries.....	225,800 00	213,390 09	13,409 91
Contingencies.....	31,000 00	30,702 26	297 74
Grand totals.....	5,432,064 55	4,459,165 45	972,899 10

RECAPITULATION OF SERVICES.

	\$	cts.	\$	cts.	\$	cts.
Ocean and river service.....	1,947,800	00	1,364,849	29	582,950	71
Public Works (Capital).....	691,900	00	542,774	29	149,125	71
Lighthouse and coast service	2,116,493	55	1,911,246	89	205,246	66
Miscellaneous.....	61,850	00	61,850	00		
Scientific institutions.....	200,000	00	188,187	74	11,812	26
Marine hospitals.....	78,000	00	74,291	36	3,708	64
Steamboat inspection.....	79,221	00	72,873	53	6,347	47
Civil Government salaries...	225,800	00	212,390	09	13,409	91
Contingencies.....	31,000	00	30,702	26	297	74
	5,432,064	55	4,459,165	45	972,899	10

	Gross.	Refunds.	Net.
	\$	\$	\$
	cts.	cts.	cts.
Piers and wharves	76,650 45	1,047,87	75,602 58
Harbours	1,157 50		1,157 50
Dominion Steamers.			
Champlain—Freight, \$3,153.74; passengers, \$7,991 87; meals, \$300.90.....	11,446 51		
Montcalm—Freight, \$1,362.86; meals, \$664.55.	2,027 41		
Rouville—Freight.....	147 00		
			13,620 92
Retired pilots' fund.....	5,605 07		5,605 07
Steamboat inspection.....	1,486 11		1,486 11
Steamboat engineers' fees.....	1,314 35	25 85	1,288 50
Sick mariners' fund.....	69,491 02	247 37	69,243 65
Signal service dues.....	335 00		335 00
Fines and forfeitures.....	550 00		550 00
Marine register fees.....	68 58		68 58
Examination, masters and mates.....	3,372 97	98 98	3,273 99
Casual revenue, sundries.....	232,855 59	8,308 79	224,546 80
	406,507 56	9,728 86	396,778 70

METEOROLOGICAL SERVICE.

REPORT OF SIR FREDERIC STUPART, DIRECTOR.

Meteorological returns have been received at the Central Office from 611 stations, exclusive of 112 storm signal stations. Twenty-seven stations have ceased reporting during the year, while, on the other hand, thirty-one have been added to the list.

The following are the new stations, together with the names of the observers:

Station.	Observers.
Rampart House, Yukon.....	Constable C. B. Tidd, R.N.W. M.P.
Swede Creek, Yukon.....	James R. Farr.
Bamfield, B.C.....	F. R. Shenstone.
Blind Channel, B.C.....	Frank W. Allen.
Chemainus, B.C.....	R. Jarrett.
Merritt, B.C.....	W. H. Boothroyd.
Osoyoos, Fairview P.O., B.C.....	George J. Fraser.
Athabaska, Alta.....	James H. Taylor.
Stettler, Alta.....	A. G. Fox.
Stry, Alta.....	George Bell.
Vegreville, Alta.....	P. C. Litster.
Youngstown, Alta.....	J. E. Strong.
Coulee, Sask.....	T. F. Blefgen.
Macklin, Sask.....	L. C. Holdsworth.
Vidora, Sask.....	E. C. Staley.
Big Chaudiere Dam, Ont.....	Daniel Bergeron.
Couchiching Falls, Ont.....	Abitibi Power and Paper Co.
Oak Ridges, Ont.....	Bro. Philip.
Pagwa, Ont.....	R. Gauthier.
Pelee Island, Ont.....	George F. Hudson.
Bell Falls, Calumet P.O., Que.....	W. S. Johnstone.
Donnacona, Que.....	C. H. O. Regan.
Grand Cascapedia, Que.....	Federal Zinc and Lead Co.
Kempt Lake, Que.....	
Kingsbury, Que.....	Rev. W. T. B. Crombie.
Manouin, Que.....	
St. Gabriel de Brandon, Que.....	Edward Hicks.
Barrington Passage, N.S.....	R. V. Ridges.
Harmony Mills, N.S.....	
Springhill, N.S.....	H. Peppard.
Bathurst, N.S.....	Bathurst Lumber Co.

CENTRAL OFFICE

Weather forecasts have, as in the past, been issued from the Central Office twice daily throughout the year for all parts of the Dominion, exclusive of British Columbia, for which province they are issued from Victoria, B.C. In addition to the Dominion forecasts, a bi-daily bulletin is wired to Newfoundland and disseminated widely in that colony. At the request of the British Air Ministry a special bulletin with forecast included has, since March, 1919, been wired twice each day to an officer of the Royal Air Force in St. John's, and very great care has been exercised to make these bulletins of value to aviators. The percentage of verification of Canadian forecasts exclusive of British Columbia has been 86.4.

The *Monthly Meteorological Record* is now printed as promptly after the close of each month, as the receipts of reports from the more distant stations will allow, and mature consideration has confirmed the wisdom of adopting this monthly form of publication in place of an annual climatological report. The monthly map has been continued in its old form, and nothing better has been

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suggested by the agriculturists whose requirements it is intended to serve; also as means of retaining the service of voluntary meteorological observers it serves a most useful purpose, as these most valued persons greatly appreciate the Dominion-wide information it contains regarding weather conditions.

The Daily Map is now eagerly looked for by an ever-increasing number of persons interested in meteorological phenomena.

For various duties in connection with the service 390 persons, chiefly observers, have been in receipt of pay, and of this number 37 were employed in the Central Office.

During the season of navigation storms were not of frequent occurrence on the Great Lakes. Twenty-one gales were recorded, and of these only five reached the force of fresh or heavy in some localities, while others just reached gale force and were not of a general character. In the St. Lawrence fifteen gales occurred, most of which were quite moderate. In the Maritime Provinces there were thirty gales, the heaviest of which attended the passage of a disturbance across Cape Breton on the 14th of November.

The percentage of verification of storm warnings was 81.6.

PHYSICS BRANCH.

The work of this Branch had been practically in abeyance during the past year, partly owing to the absence from the office of Mr. J. Patterson, M.A., who has been engaged with the Department of Invention and Research of the British Admiralty, and partly from the fact that owing to increased duties with the Forecast Branch, the Director has been unable to give time to atmospheric research work. Mr. Patterson will shortly be relieved from Admiralty work, and steps are being taken to augment the Forecast staff, which, through unexpected events, has been temporarily crippled.

AGRICULTURAL METEOROLOGY.

The results from the experimental wheat plots on the Dominion Experimental Farms during the year 1918, have been received, forming the fourth annual series. The results of observations by correspondents of the Dominion Bureau of Statistics on the occurrence of certain vegetative epochs in respect to spring wheat throughout the Dominion during 1918 have also been received from the Bureau. The greater part of some 2,000 correspondents answered more or less fully the questions presented, a summary of the information obtained having been published in the Bulletin of Agricultural Statistics. A detailed comparison of this data with the corresponding meteorological data is now being made and progress will be reported in an early number of the Bulletin of Agricultural Statistics.

Statistical studies of the yield of oats and the weather in the Maritime Provinces and Ontario since the year 1880, have also been carried on. If the statistics of yields in the earlier years are entirely trustworthy, then the relation between the weather changes and the yields of oats is more obscure than in the case of spring wheat. A comparative study in detail of the two years 1915 and 1916 has afforded material for interesting inductions. 1915 was almost universally a good year for cereals, while 1916 saw an almost universal decrease in yield per acre, amounting in many cases to 50 per cent of the 1915 yield. From these comparisons it would appear that very early sowing of oats is essential in Ontario, and that a subsequent large yield is favoured by a uniform gradual growth of the straw. Rather cool weather and a moist soil, with no extreme variations from the normal weather are necessary.

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INSPECTION OF STATIONS.

The following stations were inspected: Southampton, White River, Port Arthur, Fort William, Winnipeg, The Pas, Prince Albert, Battleford, Qu'Appelle, Moosejaw, Swift Current, Medicine Hat, Calgary, Edmonton, Banff, Kamloops, Vancouver, Prince Rupert, Victoria, Sherbrooke, Barachois, Point St. Peter, Corner of the Beach, Percé, l'Anse au Beaufils, Cape Cove, Grand River, Gaspé, Harrington Harbour, Natashquan, Esquimaux Point, Deseronto.

MAGNETIC OBSERVATIONS.

During the fiscal year ending March 31, 1919, photographic records of the daily changes in the magnetic elements were obtained without material loss. At Agincourt the declination, horizontal force, and vertical force are recorded, and at Meanook the declination.

During excessively cold weather some difficulty has been experienced in keeping the driving mechanism in operation at Meanook and to overcome this, and also to make provision for installing more complete equipment, it has been proposed to construct an underground room to house the clocks and differential instruments.

Tables showing the magnetic character of each day of the year are sent to the International Commission on Terrestrial Magnetism. An analysis of the reports received from all magnetic observatories in the world is made by the commission, and a report issued giving the five most quiet days each month and the five most disturbed days, and in conformity with the request of the commission these days are used in analysing the magnetic data obtained at both Agincourt and Meanook. The final results for the year 1916 are now in the hands of the printer, and those for 1917 are in course of preparation.

A summary of the results of observations for both Agincourt and Meanook are published in the transactions of the Royal Society of Canada and in the *Journal of the Royal Astronomical Society of Canada*.

At the request of the Surveyor General, index corrections for the compass attachments on sixty-eight surveyor's theodolites were determined at Agincourt and the results sent to him. Assistance was also given to members of his staff in standardizing their total force instruments at Agincourt both before and after their field work, and instructions as to the method of observing.

Assistance was given to Mr French, of the Dominion Observatory, in standardizing his magnetometer both before and after his field work.

A special report on the changes taking place in the magnetic elements during the solar eclipse of June 8, 1918, was made to Dr. Bauer, Director of the Department of Terrestrial Magnetism, Carnegie Institution, Washington, which he has included in his paper published in "*Terrestrial Magnetism*," Vol. XXIII, Nos. 3 and 4, on "Results of Magnetic observations made during the Solar Eclipse of June 8, 1918."

The accompanying tables give a summary of the results obtained at Agincourt and Meanook for the fiscal year 1918-19.

Magnetic disturbances were of frequent occurrence. The most pronounced were on the following dates: 1918—April 4, 5, May 16, 17, June 9, 10, August 15, 16, September 21, October 15, 16; 1919—February 27, 28, March 20, 21, 22,

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SUMMARY of Results of Magnetic Observations at Meanook for Fiscal year 1918-19.

Month.	Mean Monthly Values.			
	D. East.	H	Z	I
1918.	° ' ''			° ' ''
April.....	27 44.0	12,936	60,410	77 54.8
May.....	42.8	990	584	53.9
June.....	44.2	948	375	53.7
July.....	43.6	915	217	53.7
August.....	43.2	930	270	53.5
September.....	44.7	934	566	56.7
October.....	44.3	928	338	54.4
November.....	43.2	928	333	54.3
December ..	42.9	953	481	54.7
1919.				
January.....	42.5			54.2
February.....	42.6	936	381	54.5
March.....	43.2	936	409	54.8

Month.	Daily and Monthly Ranges.		
	Declination.		
	Mean Daily Range.		Absolute Monthly Range.
	From hourly Readings.	From Max. and Min.	
1918.			° ' ''
April.....	15.0	57.2	2 43.5
May.....	16.7	38.9	2 35.4
June.....	17.0	40.3	3 21.8
July.....	17.7	34.3	1 53.9
August.....	18.4	56.4	3 26.0
September.....	16.3	61.0	3 19.5
October.....	9.3	53.0	2 52.5
November.....	10.3	47.6	3 19.3
December.....	11.0	46.1	3 12.3
1919.			
January.....	9.4	43.7	3 06.6
February.....	9.3	50.8	2 53.5
March.....	11.5	59.3	2 53.9

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SUMMARY of Results of Magnetic Observations at Agincourt for Fiscal Year 1918-19.

Month.	Mean Monthly Values.			
	D West	H	Z	L
1918.	° '	°	°	° '
April.....	6 38·1	15,921	58,392	74 44·9
May.....	38·4	924	365	44·3
June.....	37·8	928	360	44·0
July.....	37·3	924	348	44·1
August.....	38·0	910	346	44·8
September.....	38·4	902	334	45·1
October.....	39·0	895	342	45·6
November.....	39·2	898	333	45·3
December.....	39·7	892	324	45·5
1919.				
January.....	39·0	898	323	45·2
February.....	39·6	896	318	45·2
March.....	40·2	885	305	45·6

Month.	Daily and Monthly Ranges.								
	D		Absolute Monthly Range.	H		Absolute Monthly Range.	Z		Absolute Monthly Range.
	Mean Daily Range			Mean Daily Range			Mean Daily Range		
	From Hourly Readings.	From Max.and Min.		From Hourly Readings.	From Max.and Min.		From Hourly Readings.	From Max. and Min.	
1918.	° /	/	° /	°	°	°	°	°	°
April.....	13·6	30·9	2 09·6	52	124	552	31	81	350
May.....	14·2	24·1	1 17·1	59	119	808	31	64	484
June.....	13·3	23·1	1 24·1	59	99	501	25	59	348
July.....	15·4	22·8	0 51·5	56	90	271	28	54	269
August.....	17·5	29·2	1 19·8	61	108	441	36	86	470
September....	15·0	30·4	1 24·0	60	118	616	44	94	538
October.....	10·1	27·2	1 35·5	49	125	559	38	88	506
November....	8·5	22·9	1 26·1	35	77	324	22	54	307
December....	6·6	20·2	1 09·4	34	89	388	25	47	326
1919.									
January.....	10·6	25·5	1 35·4	36	84	334	16	38	280
February.....	7·6	23·0	1 05·0	38	94	440	17	41	271
March.....	9·9	31·7	1 29·0	57	129	630	35	76	440

TIME SERVICE.

During the year ended March 31, 1919, 57 determinations for time were made by transit of stars, in the meridian, with the 3-inch Troughton & Simms transit instrument. The position of the stars has been taken from the American Ephemeris. The instrumental errors in collimation have been determined by reversal upon Polaris and in conjunction with the determination of the instrumental azimuth by star transits in reverse position of the axis, using the method of least squares in their computation.

Time, as usual, has been given over the telegraph and telephone lines to all inquirers. The various clocks have continued to perform their functions satisfactorily, and the instrumental equipment generally continues in a fine condition of adjustment and stability.

During the war several ship's chronometers have been rated and tested for use on the vessels constructed here, also a number of aneroid barometers and various articles of equipment of the soldiers have been examined and corrected when necessary.

The usual time exchanges between Toronto and Quebec, Montreal and St. John, N.B., have been made, being recorded on the chronographs at Toronto,

Montreal, and St. John. The errors of the clocks have been computed from the latest observations.

The 11.55 a.m. signals have been given over the fire alarm systems throughout the year.

Time has been given weekly to the magnetic observatory at Agincourt and the Canadian Northern Railway system out of Toronto.

The mean time clock system throughout the observatory was adjusted to daylight saving time by moving the hands forward one hour at 1 p.m., April 13, 1918.

SOLAR OBSERVATIONS.

The sun was observed on 153 days, and on all of these days spots were visible. Maps were made with the 6-inch refracting equatorial telescope, using a 50-power eyepiece, the projected image being 5 inches in diameter. The mean sun-spot relative numbers for the months of the civil year ending December 31, 1918, were: January, 80.9, February 48.2, March 70.2, April 81.5, May 66.5, June 49.2, July 101.3, August 91.8, September 81.2, October 87.5, November 79.7, December 57.1, yearly mean being 74.6. These relative numbers are computed from Wolf's formula, $r=10g+f$ where g is the number of groups visible on any day, and f the total number of spot, whether they were in the groups or isolated.

The following table will show the differences between the times at the several observatories and that at Toronto. The sign + indicates slow of Toronto.

Date.	Montreal.	Quebec.	St. John, N.B.
1918.	Seconds.	Seconds.	Seconds.
April 19.....	+0.53	+0.42	-0.19
May 3.....	-0.36	+0.39	-0.98
May 31.....	-0.58	-0.50	+0.21
June 28.....	-1.51	-0.54	
July 26.....	-0.52	-0.26	-0.21
August 16.....	+0.15	+1.19	+0.14
August 30.....	-0.64	+0.41	-0.42
October 11.....	-1.19	+0.54	-0.55
November 1.....	-0.59	+0.45	-0.53
November 22..	+0.10	-4.15	+0.38
December 20.....	-1.03	-0.23	-0.57
1919.			
January 17.....	-0.34	+1.76	-0.29
February 7.....	-1.64	+1.36	-1.00
February 21.....	-1.25	-0.44	-1.17
March 7.....	-1.57	-0.61	-0.94
March 28.....	+0.47	+1.13	+0.46

SEISMOLOGICAL OBSERVATIONS.

The seismographs at Toronto and Victoria have been kept in successful operation throughout the year and have yielded some very interesting seismograms. No change has been made in the adjustments of the instruments, the booms being kept at a period of 18 seconds.

Record was made of 134 quakes, which is 44 per cent more than usual. Of these, 102 were less than one mm. amplitude, 20 of a moderate character and 12 were large. The largest occurred on:—

- April 21, with epicentre in the San Jacinto Valley, Cal.
- May 20, with epicentre in Chili.
- May 23, with epicentre in Alaska.
- August 15, with epicentre south of the Phillipine islands.
- October 11, with epicentre off the island of Porto Rico.
- November 8, with epicentre north of Japan.
- December 4, with epicentre, Chile.
- December 6, with epicentre off the coast of Vancouver island.

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The quake of August 15 was followed by a tidal wave which swept the Malay archipelago and the islands of the Pacific. A tidal wave also followed the quake of October 11 causing a large loss of life and property over the greater part of the island of Porto Rico. During the Vancouver quake of December 6, the powerful light on the Estevan lighthouse was temporarily put out of commission by the mercury being shaken out of the lens table so that the lens could not revolve until new mercury was supplied.

We continue to forward abstracts of all our observations to various seismological centres throughout the world, and copies of the principal disturbances to the chief seismological observatory of the British Association at Shide, Isle of Wight. We also publish the records in several journals, and on request furnish the Associated Press with information regarding the character of any large disturbance and the distance from Toronto to the epicentre as ascertained from the time of arrival of the various waves. The Toronto evening papers are sometimes furnished with copies of the disturbances.

I hope shortly to replace the present Milne instruments which are considered obsolete, with the new type as adopted by the British Association at a large number of their stations; and also to equip the magnetic observatory at Meanook, Alta., with a similar type of instrument. The old Milne instruments fail in a great number of cases to register the preliminary waves of distant quakes. The study of these waves is of considerable importance at the present stage of seismological investigation, as they afford the means for increasing our knowledge of the structure and formation of the interior of the earth, and it is desirable that they be distinctly recorded. The new type of instrument fulfils these conditions.

PHENOLOGICAL OBSERVATIONS.

Reports of phenological observations giving the dates of ploughing, sowing and reaping of grain, also the first flowering of plants, etc., together with the dates when becoming common were received from forty-seven stations throughout the Dominion. These observations indicate very fairly the climatological conditions and their effect in the districts from which reports were received. In addition to these reports schedules of average dates for similar phenomena in Nova Scotia were kindly supplied by Dr. A. H. Mackay, Superintendent of Education for that province. Mr. W. H. Magee, Inspector of Schools for Saskatchewan also kindly supplied schedules prepared at several schools under his inspectorate. The collection and preparation of these statistics for publication is in charge of Mr. F. F. Payne.

APPENDIX "A".

The Director of the Quebec observatory reports as follows:—

All the usual meteorological observations, as well as those for calculating the correct time have been done as in the past, and I have on all occasions, inasmuch as possible, given to the public, information concerning the time, weather conditions, etc.

The time-ball, which has been put in good order in the spring of 1918, has been operated during the whole of navigation season which ended about the end of January last; but owing to exceptionally favourable weather conditions during the rest of the winter, and as the noon-gun had been discontinued since the beginning of the war, I have deemed it my duty to continue the dropping of the time-ball. It is still in operation, but during the course of my last inspection, at the end of March, I have found that it needed some repairs.

Since the 29th of March last, the military authorities on the Citadel have resumed the firing of the noon-gun for which signals are given from the observatory. The gun is also fired at 9.30 p.m. every day.

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I deem it my duty to draw your attention to the present condition of the observatory buildings.

In November, 1913, the Resident Engineer of the Public Works Department at Quebec, after making a personal inspection of the buildings, informed me that he had reported to his department that they were in such a bad state of repairs as not to be susceptible of any profitable alterations or improvements, and that he had advised his department that a new building was necessary.

Owing to war conditions, no action was taken on this report, and during the six years which have elapsed since that date, no repairs of any kind have been made, and conditions have not improved.

I would respectfully suggest that this question be taken up as early as possible with the Department of Public Works, with a view of arriving at a satisfactory solution of this question.

The observatory is situated within the National Battlefields park, and occupies a space of 300 feet by 200. The grounds have never been fenced and it would be necessary for the protection of the various instruments lying in the open, that a suitable fence be erected, in order to prevent their being tampered with by the public visiting the park.

I would also suggest that some arrangements be made in order to have the grounds of the observatory properly looked after and maintained in keeping with the National Battlefields park.

APPENDIX "B".

The Director of the St. John, N.B., observatory reports as follows:—

No changes of importance from my previous report have been made in the meteorological equipment or the exposures. The tri-daily observations have been continued without interruption at equal intervals of six hours, commencing at 9 a.m. The eye-readings of the standard instruments made at these intervals serve the purpose of checking the electrical and autographic recorders from which hourly values are tabulated, as well as for the messages wired night and morning to Toronto for use on the synoptic chart. All the meteorological apparatus and instruments have been maintained in satisfactory condition. Frequent changes of the anemometers and wind vanes both at St. John and Point Lepreau have been made to ensure best results, duplicates being kept in repair for this purpose.

The wind station at Point Lepreau gives valuable record of direction and velocity for that portion of the bay of Fundy. The record sheets from the anemograph being sent here weekly for analysis and tabulation.

Comparison of instruments for engineers, the military and others has been made, as well as chronometers timed and rated for the Navy.

The monthly reports received from all the observers in the Maritime Provinces have been carefully checked and in most cases sums and mean values extracted. After abstracting the necessary statistical and climatological data for our record books, these returns are forwarded to the Central Office. Inquiries by letter and telephone from shippers, transportation companies, engineers and others, have largely increased and in some instances a considerable amount of clerical work is caused by these requests for information. During the past year these inquiries have been exceptionally numerous. Innumerable daily telephone calls are made for the weather forecasts, the time, and other information pertaining to this office.

The weather bulletin received each week-day morning from Toronto has been issued with the least possible delay, is posted in public places, distributed through the mails and published by the evening papers. The synopsis, giving movement of important changes throughout the continent and prevailing weather and atmospheric conditions at the different stations adjacent to our

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coasts, and the forecasts for following days are of the highest importance to mariners, shippers of perishable goods and various other commercial and personal interests. Numerous telephone calls are daily received for the forecasts and other information pertaining to the weather.

In addition to our daily local report the press is frequently furnished with information, especially during the stormy season or when periods of extreme or unusual conditions prevail.

TIME SERVICE.

Observations for time with the 3-inch O. G. Troughton & Simms transit telescope have been made on clear nights. All observations are made with the transit micrometer, reversing to eliminate collimation and pivot error on each star, nine contacts being made in each position of the axis and records from these contacts recorded on the chronograph along with the seconds of the observing clock in the usual manner.

The rates of the sidereal clocks have been small and steady, particularly that of the primary sidereal, which is run under constant pressure and temperature. The sealing of this clock has remained absolutely perfect, and no use of the air pump has been required for the past three years.

Comparisons of the mean time and sidereal clocks are made on the chronograph and any small correction necessary to the mean time transmitting clock is made by the electrical application of small weights as heretofore reported.

The Time Balls at St. John and Halifax have continued in operation each weekday throughout the year. With the introduction of the so-called Daylight Saving time authorized by Parliament, our mean time clocks were advanced one hour from Atlantic Standard Time and the Time Balls dropped accordingly. But, owing to the objections of the Admiralty, the Time Balls reverted to Atlantic Standard Time on the 1st of August, and have since been dropped by that standard.

The master clock in Halifax was cleaned and adjusted in September, and has since continued to give most satisfactory service. While the clock is not of the highest order of precision, it has a well compensated pendulum, and its error, which is daily corrected by the synchronizing signal from our standard mean time clock, is inappreciable for its duty of automatically dropping the Time Ball, firing the time gun and hourly synchronizing clocks electrically connected with it in Halifax.

The daily time signal has been telegraphed to all Western Union offices in the Maritime Provinces and is the standard time for this portion of the Dominion.

The principal chronometer and watch adjusters in Halifax have sounders on their premises connected by wire with the Western Union office there and receive our 10 a.m. time signal daily. Some installations of electric clocks in Halifax use this signal to automatically synchronize their master clocks. In St. John the system of hourly synchronizing tower, street, and office clocks continues to give most satisfactory and useful results. A special wire from the Observatory to the local telephone office operates the various clock line relays. The telephone company makes a nominal charge for this wire service, which is well taken care of.

APPENDIX "C."

The Director of the Gonzales Heights Observatory, Victoria, B.C., reports as follows:—

During the past year the regular meteorological observations have been taken and the weather forecasts have been issued twice daily, except on Sundays. The sphere of usefulness of the latter has been considerably extended, for since May, 1918, these forecasts have been issued daily for the Kamloops and Kootenay

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districts, as well as being published in the press of Vancouver island and the Lower mainland. These forecasts are of particular value to fruit growers respecting the probable advent of early and late frosts. Storm warnings have been displayed at Victoria, Nanaimo, and Vancouver, in advance of important ocean storms, and special weather reports sent to owners of small towing and fishing craft.

A monthly summary of the weather conditions obtained from our British Columbia telegraph stations has been regularly published in the press of the province.

During the summer months the Provincial Forestry Department was advised of coming hot spells which were likely to cause an increase in the number of forest fires.

Daily river observations were taken at Yale during the past spring and summer months, and information during certain periods of probable flooding in the Lower Fraser valley was given to the press of the Lower mainland.

The monthly weather reports received here from 135 stations in British Columbia have been regularly checked, entered in our register, then forwarded to you for publication. Weather reports are also received from seventy-three provincial stations. These are treated in a similar manner.

TIME SERVICE.

Regular star transit observations have been taken, and accurate time has been maintained. The time-ball on the Belmont building has been regularly dropped daily at 1 p.m. (Sundays included) from this office. Time is also frequently furnished by telephone to certain large institutions who are not able to see the ball, including the Dominion Astrophysical Observatory.

At 10 a.m. daily the time is sent by wireless through this office to all wireless stations within a radius of 300 miles. This time is also picked up by the various ships both at sea and in the harbours within the above radius.

During the past year nearly 1,000 visitors, including many students, have been shown through this observatory; they have been delighted with the magnificent view from the roof, and were deeply interested in the delicate instruments installed here.

The correspondence here is steadily increasing, including numerous inquiries respecting climatic conditions in various parts of the province.

SEISMOLOGY.

During the past year 130 earthquakes were recorded here, while in 1917-18 the number was 114. The greatest number occurred in September, 1918, and was seventeen, while the smallest monthly number was four in February, 1919.

On December 31, 1918, the East-West Milne seismograph has been in continuous operation for twenty years, and during that period 1,624 quakes have been recorded here. I have also obtained from this instrument the slow daily movement of the pendulum for the entire period amounting to 7,300 observations. These readings have been reduced to monthly and annual means, and from the latter a normal for these twenty years has been obtained. The following table shows the yearly departure from normal, the plus sign represents an easterly movement and the minus a westerly swing. The annual number of recorded quakes is also shown in another column.

From these figures it appears that generally during years when the pendulum is farthest from the normal or zero that the largest number of quakes are recorded. The most marked correspondence is shown in 1900, 1906, 1910, and 1918. These may be termed years of abnormal earth unrest; while in 1904, 1908, and 1913 normal conditions prevail and fewer quakes are recorded. The

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larger number of quakes recorded from 1914 to 1918 is partly due to the ideal rock foundation obtained at the present site, which had been in use since April, 1914.

Respecting the vertical seismograph, which records on smoked paper, I have designed and installed for it a very sensitive electro-thermostat, which automatically keeps the temperature of the inner chamber (75 degrees) constant to within one-tenth of one degree F. This fine adjustment ensures a constant record throughout all seasons of the year.

In conclusion, I would respectfully urge that the Milne-Shaw type of British seismograph asked for last year in my previous report be purchased, in order that even more efficient results may be obtained. In connection with this, I may say that special cushioned floors were introduced in all the basement rooms, and fine cement piers erected for these delicate seismographs when the Observatory was built.

VICTORIA, B.C.

Year.	Departure from Normal of E-W Horizontal Pendulum.	Number of Quakes.
	m.m.	
1899.....	-29.5	97
1900.....	-74.0	91
1901.....	-62.9	86
1902.....	-45.5	61
1903.....	-16.9	58
1904.....	- 1.8	56
1905.....	+ 5.7	64
1906.....	+21.7	87
1907.....	+17.4	60
1908.....	+10.0	57
1909.....	+18.8	58
1910.....	+40.1	68
1911.....	+41.2	59
1912.....	+19.5	71
1913.....	-18.2	64
1914.....	+ 7.7	110
1915.....	+35.6	102
1916.....	+31.5	135
1917.....	+29.8	111
1918.....	+35.7	129
Total.....		1,624

APPENDIX "D".

The Director of the McGill University Observatory, Montreal, reports as follows:—

The uninterrupted routine required for systematic meteorological observations has been followed. "Carry on" has been the watchword of the year. The unrest of the times and minor considerations prompted a rigid observance of economics, without which we should have been glad to note additions to our equipment and activities.

The work, as in former years, has been in the making of the meteorological observations and regular reports prescribed by the Meteorological Service, the supplying of time signals to a very large public and the meeting of growing demands from a large city for such information as may be expected from such a station in its midst.

Continuous records of the pressure and temperature of the air, the direction and velocity of the wind, the rainfall, humidity, and hours of bright sunshine have been taken from the automatic registers. The regular readings of the

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standard instruments have been made and the telegraphic reports and returns on prescribed forms to the Meteorological Office we trust have been satisfactory.

The local press has been regularly supplied with summaries of each day's weather in the form of bi-hourly readings. Special information on any question involving questions of local weather or climatic data is given the press or public on demand. One hundred monthly abstracts of the weather are printed for free distribution.

The daily forecast, received from the Toronto office is available for the public by 11 a.m. The Daily Bulletin follows a few hours later. The Daily and Monthly Weather maps and the Monthly Record are accessible. All demands for information are immediately attended to. In a large city the requests are various.

Progress has been made on the digesting of accumulated data of the past forty-five years into a systematic arrangement of the numerical climatic normals for Montreal. The question of publication of this will be broached later.

The revenues and expenditures of the observatory pass through the hands of the Bursar of the University; the former, consisting of the grants and rentals given from the Meteorological Service and the subscriptions for time signals from the corporations and parties receiving them, under former arrangements at times were insufficient to prevent a deficit. The cost of materials and living has increased. Without growing revenues, economy, which is irksome, has been necessary.

The financial statement of the Bursar cannot be completed before June 30, but we are hopeful of seeing no discredit.

The offices prove sufficient for present activities. The question of drastic heating re-arrangement must be met. During the past comparatively mild winter, the steam radiators required supplementing by gas grates and electric heater. The fuel charge is thus much too high for the comfort attained in cubic feet. The heating engineer of the University is now convinced of the fact.

The writer has rented his quarters in the observatory residence and finds this of advantage. An extension telephone to his quarters gives frequent opportunities of answering inquiries out of office hours.

The staff consists of a young lady in the office, the writer and assistant who is a science graduate of the University and acts part time as Demonstrator in the Surveying Department.

The promptness with which all requisitions of needed supplies from the Meteorological office or the University have been met is appreciated. The services of the G.N.W. Telegraphic Company have been more satisfactory than in the past. The honour of several visits from the Director of the Meteorological Service is recalled with pleasure.

The adoption of the Daylight Saving Time proves of no inconvenience. Those records from which the more important diurnal values may be derived are recorded as formerly, on Standard solar time.

The Callendar Patent Electrical record of differences of temperature between the summit of Mount Royal and the observatory thermometer screen, is kept in operation. New and more efficient storage batteries have been installed. Tests are intended to ascertain the reliability of the record under the cable conditions, and further analyses of the records may remove a present suspicion that the investigation is somewhat futile.

The outstanding features of the weather have been the wet period in September and October of 1918 and the mildness and uniformity of the winter just past.

In connection with the rainfall records, valuable information, especially from an engineering standpoint, would be derived from the installation of gauges at scattered points in the city and suburbs. Competent parties to attend these,

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engineers and others, would gladly give their services gratis and comparison of synchronous records would be most interesting. Hellmann's results from measures made within a 10-mile radius at Berlin give some idea of discrepancies met elsewhere. The great differences in rainfall over various parts of the island of Montreal are not unknown but as yet insufficiently investigated. Time Service: Determinations of clock errors have been made by observations of 560 star transits on 104 nights. The sidereal clocks, Riefler No. 191 and Ballou No. 102 have performed satisfactorily. The Riefler clock is kept sealed and allowed to run on a present rate of 0.030s. per hour. The high rate presents no disadvantage as it keeps nicely. A much smaller rate may of course be attained by changing the air pressure on the pendulum. An electrical heater installed in the clock basement has been of advantage. The passage of tunnel trains, a few hundred feet distant, may be heard but, since the cessation of blasting operations, an assignable effect on the clocks has not been found.

The Troughton & Simms transit with electrically recording micrometer, enables careful time determinations to be readily made in which the probable error of the mean may not, at times, exceed -0.02 sec. for a set of 6 or 8 stars.

The Howard clock, which is regulated to transmit the Standard Time signals, is still in service. The pendulum is a very heavy one with steel and zinc compensation and a most faithful time keeper. The clock has been running steadily for 43 years, subject only to minor repairs, the additions of various contact breaks for the signals and clearings. It is showing certain defects, which we propose to remedy, and a second Howard clock is at present being fitted with similar attachments for the signals, to afford opportunities for experimentation with the old one.

The Canadian Pacific and Grand Trunk railways continue, as in the past, to utilize our signals, and, as well, a number of city jewellers, the various city stations, and the shipping.

The dropping of the Harbour Commissioners' noon time-ball has been carefully observed on all week-days. At certain times in the past winter no current in the loop made our good intentions to give the signals fruitless, but the responsibility, in each case, was found to rest with the outside lines. We again recommend that the Harbour Commissioners expose this time-ball at a site visible to the shipping. The present site is obscured from the view of a great part of the vessels in port at any time.

The results of sixteen time exchanges with Toronto Observatory have been recently submitted.

In times of peace ahead and among those measures of reconstruction to come, we hope for this observatory a larger place in the sun.

To this end, as one of the chief stations of the Meteorological Service of Canada, we trust that that Service prospers as it deserves.

REPORT OF THE MEDICAL SUPERINTENDENT OF MARINE HOSPITALS SERVICE FOR THE FISCAL YEAR 1918-19.

In the whole history of this branch of the Public Service, the year which terminated on the 31st March, 1919, was unquestionably the most active. Spanish influenza and its resultant diseases, which caused such terrific ravages throughout Canada and other countries in the latter part of September and during October and November, 1918, was very seriously felt amongst mariners, both on the Atlantic and Pacific coasts. On certain vessels as many as two-thirds of the crews were stricken with the disease.

As the epidemic occurred at the very time when shipping was most active, a large fleet of vessels being then employed in carrying foods and war materials for the troops overseas, there was a great danger that navigation would be tied up; however, on account of the great energies displayed by our medical officers and port physicians, such a disaster was avoided, and shipping experienced very little delay. I beg leave to be allowed to submit that great praise and credit is due to these officials for their excellent work.

It is also very gratifying to report that the death-rate amongst mariners, from the epidemic, was remarkably low. The greatest number of cases in which the result was fatal were those of seamen who were taken ill at sea, several days before they could be landed and taken to the hospitals. They were therefore deprived of proper care and treatment at the very time when these were most essential to promote recovery.

Soon after the outbreak of the epidemic our regular hospitals filled up to capacity, and in order to accommodate the ever-increasing number of new patients it became necessary to open emergency hospitals. In other instances surgical cases had to be removed to private hospitals, to prevent the patients from contracting the disease.

Owing to this epidemic, and in view also of the fact that at some of the larger ports, viz., Halifax, St. John, Montreal, etc., the per diem rate for hospital treatment had to be increased in order to meet the increasing cost of foods, help, etc., the amount of \$75,000 voted by Parliament was insufficient to cover the whole expenditure, and consequently a great number of accounts had to be transferred and paid out of the appropriation for 1919-20. However, an amount of \$22,500 was placed in the estimates for this year to cover this unforeseen expenditure.

The number of sick mariners who received treatment during the year 1918-19 was 3,167, as compared with 2,102 for the previous year.

The total number of hospital days was 34,340.

The number of vessels which paid Sick Mariners' Dues was 2,985, and the membership of crews 68,920.

The following statement gives the number of seamen treated, and the number of days of hospital treatment, at the larger ports.—

	Seamen.	Days.
<i>Montreal—</i>		
General Hospital.....	609	5,464
Notre Dame Hospital.....	103	1,316
Harbour Emergency Hospital.....	123	1,782
<i>Quebec—</i>		
Jeffrey Hale Hospital.....	140	2,181
Hotel Dieu Hospital.....	14	317
Civic Hospital.....	4	39
Levis, Hotel Dieu Hospital.....	26	348
<i>New Brunswick—</i>		
St. John General Public Hospital.....	178	2,530
Board of Health.....	32	469

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	Seamen.	Days.
<i>Nova Scotia—</i>		
Sydney Marine Hospital.....	324	7,664
Halifax Victoria General Hospital.....	163	2,446
Yarmouth.....	124	1,179
<i>Prince Edward Island—</i>		
Charlottetown Hospital.....	12	261
Prince Edward Island Hospital.....	5	28
<i>British Columbia—</i>		
Prince Rupert General Hospital.....	70	705
Vancouver St. Paul's Hospital.....	144	2,837
Victoria St. Joseph's Hospital.....	83	1,239

The total expenditure on account of Marine Hospital Service for 1918-19 was \$73,291.17, with the following distribution, by provinces:—

Quebec.....	\$	22,883	15
New Brunswick.....		7,170	43
Nova Scotia.....		28,171	51
Prince Edward Island.....		1,456	10
British Columbia.....		9,145	85
General Account.....		428	59
Naval Service.....		3,921	94
Ship Channel.....		113	60
Total.....	\$	73,291	17

REPORT OF L. A. DEMERS, WRECK COMMISSIONER.

Formal investigations during the year.....	31
Departmental investigation.....	1

During the calendar year 1918 there were 226 casualties reported to the department, the tonnage of the same being 312,928, and the stated damage \$1,818,895, while 402 lives were lost.

Of this total number of casualties 180 were to coasting and sea-going vessels, the tonnage of the same being 280,528, and the stated damage \$1,713,795, 402 lives were lost, 46 of the casualties were to inland vessels, the tonnage of the same being 32,400, and the stated damage \$105,100.

In 129 cases of casualties to coasting and sea-going vessels and 24 cases of casualties to inland vessels the amount of damage is not stated; 70 of the casualties to coasting and sea-going vessels, made up of 27 steam and 43 sailing vessels, resulted in total losses, and of this number 60 were Canadian, two British and eight foreign vessels.

Seven of the casualties to inland vessels resulted in total losses; all were Canadian vessels.

Casualties are given under the following headings:—

Coasting and Sea-going Vessels.

Collisions.....	30
Foundering.....	28
Missing vessels.....	3
Miscellaneous accidents: fire, loss of sails, etc.....	20
Strandings.....	79
Vessels sunk by submarines.....	20

Inland Vessels.

Collisions.....	17
Foundering.....	4
Miscellaneous accidents.....	8
Strandings.....	17

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STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1918-1919.

Name of Ship. Official Number and Registered Port.	Remarks.
Aikoku Maru..... Japanese.	On June 12 stranded on Kelp reef, Hare straits, British Columbia. Formal investigation was held at Victoria on June 21 and 22, before Capt. John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Capt. D. S. Jones-Evans and Capt. A. C. Cooper, acting as nautical assessors. <i>Finding.</i> —No one to blame; accident due to abnormal strong ebb tide.
Afghan Prince..... 118617 Newcastle.	On July 30 stranded near Guion island, Cape Breton. Formal investigation was held at Sydney, on September 13, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. A. J. Morrison and Lieut. H. C. Owen, acting as nautical assessors. <i>Finding.</i> —Master, Robert Milliken, severely reprimanded and advised to be more cautious in future.
Brookdale (barge)..... 137968 Montreal.	On June 8 barge <i>Brookdale</i> collided with N.S. & T. Bridge, at Thorold, Welland canal, whilst in tow of tug <i>Escort</i> . Formal investigation was held at Toronto on November 21 and 22, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. J. R. Foote and Capt. Jas. McMaugh, acting as nautical assessors.
Escort (tug)..... 97010 St. Catharines.	<i>Finding.</i> —Master of the tug <i>Escort</i> , William Wright, found in default for not ascertaining that bridge was not opened. His certificate is suspended for six months.
Boeroe (transport).....	Her cargo was damaged by water, between Montreal and Quebec. Formal investigation was held at Quebec on September 26, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Captains Chs. Koenig, Chas. Lapierre and W. F. Fletcher, acting as assessors. <i>Finding.</i> —Damage to floor in Nos. 2 and 3 holds due to the fact that a connection had been made from the sea through the main bilge lines to No. 2 hold.
Brookdale (barge)..... 137968 Montreal	On June 7 collided with Welland bridge. Formal investigation was held at Toronto on November 21, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. J. A. Foote and Capt. Jas. McMaugh, acting as nautical assessors.
and Escort (tug)..... 79010 St. Catharines.	<i>Finding.</i> —Both masters severely reprimanded.
City of Vienna..... 135577 Liverpool.	On July 2 stranded near Sister ledges, Sambro, N.S. Formal investigation was held at Halifax on July 8 and 9, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Com'dr. G. E. Bridge, R.N.R., and Lieut. J. L. Poppleton, R.N., acting as nautical assessors. <i>Finding.</i> —Master not in fault, but he committed an excusable error of judgment in not stopping his ship when hearing Sambro fog signal.
Celtic Prince..... 140718 Newcastle.	On July 8 stranded on Barnaby islands. Formal investigation was held at Montreal on July 31 and August 9, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. Chs. Lapierre and Capt. F. Nash, acting as nautical assessors. <i>Finding.</i> —Master, Alf. H. McKegg, censured for error of judgment in proceeding at half speed in such shallow waters.
Corinthian..... 111257 Glasgow.	On December 14 wrecked on Briar island. Formal investigation was held at St. John, N.B., on December 29, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. Jas. Everett and Capt. A. J. Mulcahy, acting as nautical assessors. <i>Finding.</i> —Loss of vessel directly attributed to indifferent navigation on part of master and first officer. D. T. Tannock's certificate as master is suspended for three months, and also certificate of chief officer, Bland B. Simpson, for six months.
Dornfontein..... St. John, N.B.	On August 2 was shelled by submarine in the bay of Fundy. Formal investigation was held at St. John on September 14, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. A. J. Mulcahy and Capt. Jas. Hayes, acting as nautical assessors. <i>Finding.</i> —Master, Chs. E. Dagnell, gravely negligent in not destroying papers. His certificate is suspended for the duration of the war.

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STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1918-1919—*Continued.*

Name of Ship, Official Number and Registered Port.	Remarks.
Dartmouth (ferry)..... 90889 Halifax and Pacific (transport).	On December 18 collided in Halifax harbour. Formal investigation was held at Halifax on January 3 and 4, before Com'dr. H. St. Geo. Lindsay, R.D., R.N.R., assisted by Capt. A. J. Whyte and Capt. F. Dodd, acting as nautical assessors. <i>Finding.</i> —Dartmouth entirely to blame, master, M. P. Murphy, failing to carry regulations regarding rules of the road. He is severely censured and ordered to pay cost of investigation.
Eugenia John Diacaki..... Grecian.	On July 2 stranded on Transport ledges, Egg island, Nova Scotia. Formal investigation was held at Halifax on July 11, 12 and 13, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Com'dr. G. E. Bridge, R.N.R., and Lieut. J. L. Poppleton, R.N., acting as nautical assessors. <i>Finding.</i> —Master, Minas Constantino, and mate, E. Moschos, found in default. Copy of finding is transmitted to Grecian government.
G. M. Cochrane..... St. John, N.B.	On February 26 foundered in the bay of Fundy. Formal investigation was held at Halifax on March 5, before Com'dr. H. St. Geo. Lindsay, R.D., R.N.R., assisted by Capt. Wm. A. Poole and Capt. H. M. O'Hara, acting as nautical assessors. <i>Finding.</i> —No one to blame; loss of the vessel caused by the carrying away of the turnbuckles on the jigger rigging.
Hochelaga..... 102730 Halifax.	On June 5 stranded at Port au Port bay, Nova Scotia. Formal investigation was held at Sydney on June 17, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Lieut. H. C. Owen, R.N.R., and Capt. A. J. Morrison, acting as nautical assessors. <i>Finding.</i> —Master, Geo. Tudor, committed a grave error of judgment in assuming a position which he could not exactly define, owing to atmospheric conditions and absence of log to determine distance run. On account of his previous good records, his certificate is not dealt with.
Lycaon..... 135467 Liverpool.	On May 7 stranded near cape Dog, St. Lawrence river. Formal investigation was held at Montreal on May 21, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. Chs. Lapierre and Capt. F. Nash, acting as nautical assessors. <i>Finding.</i> —Pilot, Arthur Larochelle, alone to blame. He is severely reprimanded and fined \$400.
Louisbourg..... 43582 Montreal.	On May 5 stranded near cape English, St. Mary's bay, Newfoundland. Formal investigation was held at Sydney on May 14, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Lieut. Com'dr. J. H. Knight and Lieut. H. C. Owen, acting as nautical assessors. <i>Finding.</i> —Master, James Kemp, in default for not having exercised necessary precaution under foggy condition. His certificate is suspended for six months, but court recommend that a mate's certificate be granted him during suspension of his master's certificate.
Lake Como..... American.	On May 9 stranded near Pointe des Monts, gulf St. Lawrence. Formal investigation was held at Montreal on May 29, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding.</i> —Master, John H. Dizer, found in default for careless navigation. Copy of finding forwarded to American Consul.
Lake Manitoba..... 113497 Liverpool.	On August 26 partially destroyed by fire, in Montreal harbour. Formal investigation was held at Montreal on August 30, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding.</i> —No one to blame; fire purely accidental.
Largo Law..... 124163 Glasgow and Samnanger (transport).	On September 18 collided in Quebec harbour. Formal investigation was held at Montreal on September 24 and 25, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Koenig, acting as nautical assessors. <i>Finding.</i> —Pilot of <i>Largo Law</i> , Moise Blouin, solely to blame. His license is cancelled.
Lightship No. 15.....	On November 2 burnt in Yarmouth, N.S. harbour. Departmental inquiry was held at Yarmouth on November 15, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner. <i>Finding.</i> —Fire caused by defective stove. Chief officer and second officer charged with neglect and incompetency.

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STATEMENT of investigations into wrecks and casualties which occurred to Canadian, and British and Foreign vessels, held during the fiscal year 1918-1919—*Continued.*

Name of Ship, Official Number and Registered Port.	Remarks.
Mulgrave.. 103042 Ottawa and King Malcolm (barge).	On February 15 stranded near Middle shoal, Nova Scotia. Formal investigation was held at Halifax on March 17, before Com'dr. H. St. Geo. Lindsay, R.D., R.N.R., assisted by Capt. H. M. O'Hara and Capt. Wm. A. Poole, acting as nautical assessors. <i>Finding.</i> —Accident due to error of judgment on part of master of tug <i>Mulgrave</i> , Emmanuel Ford, who is cautioned to be careful in future.
Okenfels..... American.	On June 30 stranded near Lower Prospect, N.S. Formal investigation was held at Halifax on July 19, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Com'dr. G. E. Bridge, R.N.R., and Lieut. J. L. Poppleton, R.N., acting as nautical assessors. <i>Finding.</i> —No one to blame. Copy of finding forwarded to United States Government.
Princess Adelaide.. 126948 Victoria.	On October 13 stranded near Georgina point, gulf of Georgia. Formal investigation was held at Victoria on November 4, 5, 6 and 8, before Capt. John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Capt. D. S. Jones-Evans and Capt. Geo. F. Cross, acting as nautical assessors. <i>Finding.</i> —Master and second officer in default, master for not being in charge of vessel when approaching dangerous locality, in heavy weather, and second officer for neglecting to take necessary precautions to insure safety of ship. Certificate of master, R. A. Hunter, is suspended for two months, and certificate of second officer, H. A. Ormiston, for six months.
Princess Sophia.. 110620 Victoria.	On October 25 stranded and subsequently lost on Vanderbilt reef, Lynn canal, Alaska. Three hundred and fifty lives were lost. Formal investigation was held at Victoria on January 10, February 10 and 11, March 10, 13 and 20; at Vancouver January 31 and at Juneau February 26 and 27, before Judge Auley Morrison, assisted by Capt. John D. Macpherson, Wreck Commissioner for British Columbia, and Capt. E. H. Martin, C.M.G., R.N., acting as nautical assessors. <i>Finding.</i> —No one to blame; ship lost through perils of the sea.
Renfrew 138682 Vancouver.	On November 10 wrecked in Nitinat river and thirteen lives were lost. Formal investigation was held at Victoria on November 20 and 21, before Capt. John D. Macpherson, Wreck Commissioner for British Columbia, assisted by Capt. Geo. Simpson and Capt. Wm. Kernahan, acting as nautical assessors. <i>Finding.</i> —No one to blame: accident due to perils of the sea.
Siberian Prince..... 135729 Newcastle.	On June 28 stranded near Lawrencetown, Nova Scotia. Formal investigation was held at Halifax on July 22, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Com'dr. G. E. Bridge and Com'dr. C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —Master, H. A. Camp, shown bad judgment and lack of proper seamanship.
Sewalls Point..... American.	On July 2 stranded at Shag Rock point, Nova Scotia. Formal investigation was held at Halifax on July 15, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Com'dr. G. E. Bridge, R.N.R., and Lieut. L. Poppleton, R.N., acting as nautical assessors. <i>Finding.</i> —Master, R. M. French, found in default for lack of prudence. Copy of the finding is forwarded to United States Government.
Sicilian..... 111225 Glasgow and Canora (car ferry). Samoli..... 114056 Greenwich.	On August 7 collided in Quebec harbour. Formal investigation was held at Montreal on August 13, 14 and 15, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding.</i> —Both master and pilot of <i>Sicilian</i> in default. Master, J. M. Reith, is severely reprimanded, and pilot, Jules Lamarre, is fined \$100 and to pay his travelling expenses. October 5 damaged by fire whilst in Quebec. Formal investigation was held at Quebec on October 17, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. Chs. Koenig and Capt. G. Houlgrave, acting as nautical assessors. <i>Finding.</i> —Inflammable material was wilfully placed amongst cases of lard stowed in No. 1 lower hold.
Troja 138215	On September 21 stranded near Pointe Citrouille, St. Lawrence river. Formal investigation was held at Montreal on September 25 and 27

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STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1918-1919—*Concluded*.

Name of Ship, Official Number and Registered Port.	Remarks.
<p>Montreal and Berrima 135332 Greenock.</p>	<p>and October 1, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding</i>.—Pilot of <i>Berrima</i>, Joseph Leveille, solely to blame for violating rules of the road. His license is suspended for two years. Certificate of second officer, Harold Beament, is suspended for two months for marked indifference to his responsibility. Second officer of <i>Troja</i>, Charles Adey, cautioned to use better judgment in future and call master when something abnormal is apparent.</p>
<p>Troja..... 138215 Montreal.</p>	<p>On March 18 stranded on Old Proprietor ledge, bay of Fundy. Formal investigation was held at St. John, N.B., on March 25, before Com'dr. H. St. Geo. Lindsay, R.D., R.N.R., assisted by Capt. J. Gillies and Capt. Chs. H. Hodder, acting as nautical assessors. <i>Finding</i>.—Accident caused by action of master, J. C. Cains, neglecting to use deep sea lead. He is severely censured and ordered to pay cost of investigation. On account of his previous good record his certificate is not dealt with.</p>
<p>Wotan and Montreal (barge) in tow of tug Weaver American.</p>	<p>On July 15 collided in Soulanges canal. Formal investigation was held at Montreal on October 18, 19 and 31 and November 8, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. F. Nash and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding</i>.—<i>Weaver</i>, <i>Montreal</i> and <i>David Mills</i> (which was following tug <i>Weaver</i> and tow) to blame. Master of <i>Weaver</i>, Joseph Seguin, lacked judgment in obeying orders of master of barge <i>Montreal</i>, of which barge he was the servant. His certificate is suspended for one month. Masters of <i>Montreal</i> and <i>David Mills</i> having certificates which cannot be dealt with by the court, are severely reprimanded for attempting to pass a vessel having precedence.</p>
<p>Winifredian..... 110584 Liverpool.</p>	<p>On August 25 stranded on St. Mary's island, strait of Belle Isle. Formal investigation was held at Montreal on October 18, 19 and 20, before Capt. L. A. Demers, F.R.A.S., Dominion Wreck Commissioner, assisted by Capt. J. O. Grey and Capt. Chs. Lapierre, acting as nautical assessors. <i>Finding</i>.—Master, F. Shepherd, erred in judgment in placing implicit reliance in the magnetic correctness of his compass and proceeding with undiminished speed in fog. He is severely reprimanded.</p>

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918.

COASTING AND SEA GOING WRECKS

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Jan. 6	Angouleme..... 138211	1	Montreal.....	Steel Steam	1,663	Toronto..... New York..	Maine-Dieu... Bar, C.B.	Stranding..... E. K. Perry.	.....	Partial.
Jan. 10	Ada D. Bishop... 130501	7	Shelburne, N.S.	Wood Schr.....	93-43	Twillingate, Nfld	.....	Missing.....	.....	Total.
Feb. 7	Albert A. Young.. 130740	9	Lunenburg.....	Wood Schr.....	92	Gibraltar. St. Johns, Nfld. Corunna, Sp.	Lat. 48° N. Long. 45° W. N. Atlantic.	Foundering..... C. F. Dodman.	.....	Total.
Mar. 4	Allison H. Maxner 134046	4	Lunenburg.....	Wood Schr.....	92-31	Lunenburg..... Lunenburg.	Black Rock, N.S	Foundering..... J. Maxner.	6	Total: Ship, \$15,000. Cargo, \$300. Total, \$90,000.
April 4	Ashmore.....	41	Arendal, Norway.	Bke. Iron Sail	1,043	St. Vincent..... Cape Verde. St. John, N.B.	Muir ledges, N.B Grand Manan, N.B.	Stranding..... S. Librensund....	.....	Partial.
May 14	Ayrshire..... 119066	15	Glasgow.....	Schr..... Steel Steam	5,931	Wellington, N. Y.... Liverpool.	Lat. 38°10' N. Long. 07°31' W. N. Atlantic.	Damage by fire.... Jas. Wallace.	.....	Partial.
June 9	Aikoku Maru.....	30	Japan.....	Schr..... Steel Steam	2,466	Seattle, Wash..... Comox, B.C.	Kepl reef, Haro strait.	Stranding..... T. Yoshihara.	.....	Partial
June 11	Arloux.....	1	.....	Schr..... Steel Steam	.....	Quebec..... Sydney.	Outer Louise Basin, Que.	In collision with "C. D." No. 38. Alb. Allen.	.....	Partial.
June 12	Alcor.....	3	New York.....	Schr..... Steel Steam	2,171	Boston..... Bordeaux.	Seal island.....	Stranding..... J. F. Dicker.	.....	Partial.
July 30	Ambition..... 112101	16	Lunenburg.....	Schr..... Wood Sail	99-50	Ingonish..... Off Gloucester, U.S.A	Battery Point, N.S	Lost sails and masts	.....	Partial, \$1,300.
July 30	Afghan Prince..... 118617	15	Newcastle.....	Schr..... Steel Steam	3,183-37	Baltimore..... La Pallice.	Lat. 45°46' N..... Long. 60°04'35" W. N. Atlantic.	Chs. Rose. Stranding..... R. Milliken.	.....	Partial.
July 4	Aganita.....	.....	.....	Schr..... Sail	35	.....	West of Louisburg	In collision with R. "C" "Loery". D. Fleet.	.....	Partial.

Aug.	5	Annie Perry.....	15	American.....	Schr..... Wood Sail	75	Boston..... Off Fishing Grounds.	Seal island.....	Shelled by sub- marine. Jas. Goodwin. Damaged by fire. J. W. Tindale.	.....	Total.
Sept.	30	Ariadne Irene..... 135201	5	London.....	Schr..... Steel Steam	2,644	Cardiff..... Marseilles.	820 miles off New York.	.....	.....	Partial.
Nov.	15	Archie A. Lowthi- cum	15	New York.....	Schr..... Wood Sail	191	New York..... Halifax.	Yarmouth Hr., N.S.	Stranding..... W. R. Johnston.	.....	Slight damage.
Nov.	15	A. Tremblay..... 138262	3	Quebec.....	..... Wood Steam	147	Quebec..... Gaspé.	Fox river..... Gaspé.	In collision with <i>Beatrice Mack</i> . A. Blouin.	.....	Partial.
Dec.	1	Alcega..... 107657	19	Yarmouth.....	Schr..... Wood Sail	99-15	New York..... Halifax.	North Atlantic.....	Foundering..... R. F. Anderson.	.....	Total.
Dec.	11	Ada Peard..... 73258	48	St. Johns, Nfld.....	Bqto..... Wood Sail	219	St. Johns, Nfld..... Cadiz, Sp.	19 miles S. of Maccio, Brazil.	Stranding..... R. Shepperd.	.....	Total.
April	25	Bonnie B..... 126106	10	Lunenburg.....	Schr..... Wood Sail	19	Canso, N.S..... Canso, N.S.	Port Mulgrave, N.S.	Foundering..... A. Feltmate.	.....	Total: Ship, \$200. Cargo, \$120. Partial, \$25.
April	31	Bruce Cairn..... 103715	5	Yarmouth.....	F. & A..... Wood Steam	32-35	Yarmouth, N.S..... Deep Cove Inlet, N.S.	Murder island, N.S.	Stranding..... I. A. Banks.	.....	Partial.
Aug.	7	Bianca.....	1	St. Johns, Nfld.....	Schr..... Wood Aux.	313	Bahia, Brazil..... Halifax.	Off Sambro, N.S.	Shelled by sub- marine. Mark Buck.	.....	Partial.
Aug.	31	Baltic Rose..... 140881	4	Vancouver.....	1 mast..... Wood Gas	653	Banford..... Fishing Grounds.	Dodges cove, B.C.	Burnt..... Geo. West..	.....	Total, \$2,000.
Nov.	24	Blanchard C..... 130508	6	Liverpool, N.S.....	Schr..... Wood Gas	11	Liverpool, N.S..... Port Mouton, N.S.	Off Port Mouton island.	Burnt..... E. Finn.	.....	Total, \$1,500.
Dec.	9	Blue Ridge.....	27	American.....	Schr..... Steel Steam	1,600	..... Quebec.	Quebec harbour....	In collision with <i>St.</i> <i>Mihail</i> . E. G. Ellis.	.....	Partial.
Feb.	6	Clara..... 215292	15	New York.....	Schr..... Steel Steam	2,540	New York..... New York.	Lat. 43°31' N Long. 41°16' W.... N. Atlantic.	Damaged in gale.... C. Thompson.	.....	Partial.
July	2	City of Vienna..... 135577	4	Liverpool.....	F. & A..... Steel Steam	3,917	London..... Halifax.	Sambro island, N.S.	Stranding..... J. W. Parrington.	.....	Partial.
July	8	Celtic Prince..... 140717	1	Newcastle.....	..... Steel Steam	3,402-87	Newcastle..... Montreal.	Barnaby island..... St. Lawrence river	Stranding..... A. H. McKegg.	.....	Partial.
July	11	Chaffey..... 31083	4	Montreal.....	..... Wood Steam	36-98	Valleyfield..... Lancaster.	Lancaster.....	Burnt..... E. Leboeuf.	.....	Total.
July	19	City of Florence..... 140559	1	Liverpool.....	Schr..... Steel Steam	4,391	London..... Montreal.	Trinity bay ..	Stranding..... E. W. Davies.	.....	Partial.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918—Continued.

COASTING AND SEA GOING WRECKS—Continued.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
July 27	Compton... 130927	36	Montreal	Wood Steam	936-76	Rochester Chicoutimi.	Red island, St. Lawrence river.	Stranding... Jas. Cochrane.		Partial.
Aug. 23	Coquittam... 100205	26	Vancouver	Steel Steam	165-67	Vancouver Nass river.	Race passage, B.C.	Stranding... C. B. Smith.		Partial, \$15,000.
Aug. 25	C. M. Walters... 137887	2	Lunenburg	Schr.... Wood Sail	82-90	La Have, N.S. Fishing grounds.	St. Pierre Miquelon banks.	Bombed by submarine. W. H. Walters.		Total, \$30,000.
Aug. 31	Clam... 101973	25	London	Schr.... Steel	2,310	Liverpool... Admiralty orders.	Halibut bay.	Stranding... R. W. Thompson.		Partial.
Sept. 6	Clifford May... 122187	10	Arichat, N.S.	Steam Schr. Wood Sail	42-81	French river Louisburg.	Northumberland strait.	Stranding... S. Cain.		Partial.
Oct. 1	Camosun... 121204	13	Vancouver	Schr.... Steel Steam	794	Vancouver Vancouver.	1st Narrows, Vancouver.	Stranding... John H. Brown.		Slight damage.
Oct. 10	Cabotia... 133825	39	Montreal	Wood Steam	931-42	Rochester Levis	Off Pt. Citrouille St. Lawrence river	Stranding... O. V. Percival.		Partial.
Oct. —	Carrie... 97081	28	Lunenburg	Schr.... Wood Sail.	99-42	Sydney... Charlottetown, P.E.I.	Pictou island	Stranding... M. Munroe.		Total, \$2,500.
Nov. 6	Craycroft...	1	Ecorse, Mich.	Steel	1,367	Batwood... New York.	Quebec harbour	Collided with gate in Louise Basin.		Partial.
Nov. 16	Cascapedia... 104632	23	Quebec	Steam F. & A. Iron	1,185	Halifax... St. John's, Nfld...	Lat. 40°43' N. Long. 55°54' W. N. Atlantic.	Foundering... Geo. Williams.		Total.
Dec. 28	Carib...	30	New York	Steam Iron	1,931	New York Nantes.	Lat. 41°30' N. Long. 58°30' W. N. Atlantic.	Damaged in gale... H. T. Rowlands.		Part, \$20,000.

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Aug.	2	Dornfontein..... 138580	1	St. John, N.B.....	Schr..... Wood	695	St. John, N.B..... Durban, S.A.	Lat. 44°17' N..... Long. 67° W.	Bombed by sub- marine. C. E. Dagnell.	Total, \$150,000.
Jan.	12	Ethel M. Bartlett. 134175	4	Shelburne.....	Schr..... Wood	92-02	Harbour buffitt, Nfld.	N. Atlantic. Liverpool bay, N.S.	Stranding. J. P. Kerby.	Partial, \$500.
May	14	Emeline Burke.... 122584	9	.....	Schr..... Wood	90	Gloucester, Mass. Georgetown, P.E.I.	Off east Point, P.E.I.	Sprung a leak. A. Arsenault.....	Partial.
July	2	Eugenia J. Diacki	24	Syra, Greece.....	Schr..... Steel	1,943	Savannah..... Nantes.	Egg island, N.S.	Stranding..... M. Constantinau.	Partial.
Aug.	7	E. E. Armstrong. 130207	1	Windsor, N.S.....	Steam Schr.....	371-18	Kingston, Ja..... Martinique.	.....	Missing..... H. Sanders.	8 Total.
Aug.	25	E. B. Walters..... 133805	5	Lunenburg.....	Schr..... Wood	97	50Lunenburg..... Lunenburg.	St. Pierre Miquelon banks.	Bombed by sub- marine. C. Walters.	Total, \$30,000.
Aug.	30	Elsie Porter..... 130819	6	Lunenburg.....	Schr..... Wood	99-57	La Have, N.S..... Fishing grounds.	Lat. 47°40' N..... Long. 48°50' W.	Bombed by sub- marine. I. Esenhauer.	Total: Ship, \$40,000. Cargo, \$30,000.
Sept.	—	Evelyn B. Miller 126814	8	Lunenburg.....	Schr..... Wood	98-91	Lunenburg..... Lunenburg.	N. Atlantic. Strait of Canso	Stranding..... R. Spindler.	Partial.
Sept.	—	Edward Pyke.... 76556	38	Liverpool.....	Tug..... Wood	33-59	Quebec..... Ste. Marguerite, Saguenay river.	L'Anse a Moreau....	Stranding..... A. Larsen.	Slight damage.
Oct.	23	Effort..... 107299	17	Annapolis Royal, N.S.	Steam Schr.....	63	.....	Off coast of St. Mar- tins, N.B.	Foundering	Total.
Dec.	8	Emma Belliveau 130520	2	St. John's, Nfld	Schr..... Wood	22-03	St. John, N.B..... Charlottetown, P.E.I.	Near Cap La Ronde, N.S.	Stranding..... A. Nicholls.	3 Partial.
Dec.	12	Edgewood..... 140956	1	Montreal.....	Schr..... Wood	698-97	Quebec..... Halifax.	Ste. Marguerite is- land.	Stranding..... C. Richter.	Partial.
Feb.	2	Flavia..... 115224	18	London.....	Schr..... Steel	5,843	Avonmouth..... Portland, Me.	Bedford basin, N.S.	In collision with <i>Huron</i> . E. F. C. Fear.	Partial.
May	19	Francisco..... 132209	18	Hull, Eng.....	Steam Schr.....	4,746	Hull..... Montreal.	Above Traverse St. Lawrence river.	In collision with un- known vessel. J. Wilkins.	Partial.
Aug.	5	Freshfield.. 106022	22	Montreal.....	Steel Steam Schr.....	2,165-79	Swansea..... Tarento, Italy.	Near Crotone..... Italy.	Torpedoed..... C. M. Evans.	3 Total.
Aug.	8	Freno..... 133720	5	Vancouver	1 mast... Wood	64	Vancouver... Vancouver.	Off White Cliff point Gowe Sd.	Burnt..... R. A. Johnson.	Total, \$20,000.
July	30	G. C. Kelly..... 88555	33	Charlottetown... P.E.I.	Steam Schr..... Wood	99	Sydney, N.S. Gaspe.	Charlottetown har- bour.	Foundering. J. W. Sherry.	Total: Ship, \$3,000. Cargo, \$1,000.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918—*Continued.*

COASTING AND SEA GOING WRECKS—*Continued.*

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Aug. 26	Cleaming..... 138390	1	Lunenburg.....	Schr..... Wood Sail	99.54	La Have, N.S.... St. Pierre Miquelon.	St. Pierre Miquelon banks.	Bombed by submarine. E. Richard.	.....	Total: Ship, \$35,000. Cargo, \$12,000. Total.
Oct. 30	Cialiano..... 136047	5	Ottawa.....	2 masts... Steel Steam	129	Esquimalt..... Skeda point.	Lat. 52°00' N., Long. 130°00' W. Pacific ocean.	Foundering. R. M. Pope.	27	Partial.
Nov. 11	Gen'l George C. Hogg. 14116	..	Parrsboro, N.S.	Schr..... Wood Sail	407	St. John, N.B.... Durban, S.A.	Digby Cut	Stranding .....	.....	Partial.
Feb.	Hurona..... 99214	25	Dundee.....	Schr..... Steel	2,156	Portland, Me Liverpool.	Bedford Basin, N.S.	In collision with <i>Fla- ra</i>.	.....	Partial.
Aug. 13	Hazel L. Ritecy 126102	10	Lunenburg.....	Schr..... Wood Sail	92.44	Gloucester, Mass... Gloucester, Mass.	Boone island, N.H.	D. Ritchie. Foundering S. F. Fudge.	.....	Total: Ship, \$12,000. Cargo, \$20,000. Partial.
Sept. 17	Helmslock..... 133888	4	Cardiff.....	Schr..... Steel Steam	2,575	Montreal..... Archangel.	3 miles below Cap Sante.	Stranding..... J. E. Hurst.	.....	Slight damage.
Mar. 5	Iskum..... 131156	6	Victoria	Schr..... Wood Steam	42.44	Sydney Inlet	Haro strait, B.C.	Stranding..... J. B. Wells.	.....	Total, \$10,000.
April 25	Inverness..... 107323	23	Halifax	Schr..... Wood Steam	46	Canso, N.S.... Canso, N.S.	Port Mulgrave, N.S.	Foundering Geo. Walsh.	.....	Partial.
May 29	I. R. Alwood. 136031	47	Barrington Pass- sage, N.S.	Schr..... Wood Gas	44.63	Magdalen Islands. Grand Manan.	Schooner passage	Stranding .....	.....	Partial.
Aug. 17	Imperoyal..... 135209	5	Sarnia, Ont....	Steel Steam	1,381	Montreal	Off Halifax	Stranding .....	.....	Partial.
Oct. 4	Industrial..... 138558	1	Lunenburg	Schr..... Wood Sail	257.25	Halifax..... La Have, N.S.	Lat. 37°57' N., Long. 56°41' W. N. Atlantic.	Bombed by sub- marine. M. C. Ponty.	.....	Total: Ship, \$85,000. Cargo, \$8,000. Partial.
Jan. 27	John Parker	4	Lunenburg	Schr..... Wood Sail	99	Catalina, Nfld Naples.	Mediterranean sea	Sprung a leak .. Art. Dean.	Partial.

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April	1.	Jessie Mac. 117115	13	Vancouver.....	Tug..... Wood Steam	38-75	Pender harbour... Vancouver.	Trail island, B.C....	Stranding..... H. Jensen.	Partial.
June	3.	J. R. Gray.....			Tug..... Wood		Quebec.....	Quebec harbour.....	In collision with <i>Cadillac</i> .	Partial.
Sept.	6.	Jean Dundonald Duff. 138545	1	Lunenburg.....	Schr..... Wood	345-30	Bridgetown, Bdes Halifax.	Gull Rock..... N. Atlantic.	Damaged in gale. M. Mossman.	Partial.
Nov.	27.	A. McKee..... 125442	10	Sault Ste. Marie..	Sail	1,374	New York..... Charlottetown, P.E.I.	Fishers island..... U.S.A.	Stranding..... J. Chapman.	Partial.
Nov.	30.	Jane Cox..... 138201	2	Shelburne, N.S...	Schr..... Wood	94	Liverpool..... Bridgetown, Bdes	Lat. 35°06' N..... Long. 59° W. N. Atlantic.	Sprung a leak. R. McAlpine.	Partial.
Dec.	1.	J. Howell Leeds.	37	Boston.....	Schr..... Wood	393	Newark, N.J..... Halifax.	Off Rain island, N.S.	Stranding..... Wm. Reicher.	Partial: Ship, \$20,000. Cargo, \$9,000.
Dec.	31.	Jean Campbell.... 128647	1	Shelburne, N.S...	Schr..... Wood	382	Cadiz..... St. John's, Nfld	Lat. 35° N..... Long. 35° W. N. Atlantic.	Damaged in gale.... L. Blandford.	Partial.
Jan.	17.	Kitwinmar..... 5	6	Vancouver.....	Sloop..... Wood	9-89	Prince Rupert..... Fishing.	Graham island....	Foundering.....	Total.
May	31.	K.N. No. 5..... 136529	1	Vancouver.....	Scow..... Gas	831	Powell river..... Tacoma, Wash.	Active pass, B.C..	Sprung a leak..... A. Stehlberg.	Partial.
Oct.	2.	Kildonan..... 96988	27	Vancouver.....	Tug..... Wood	62	Vancouver..... Brockton point.	Burrard inlet....	Stranding..... R. T. Doever.	Partial.
Jan.	29.	Lottie A. Silver. 130820	6	Lunenburg.....	Schr..... Wood	96-16	St. John's, Nfld... Gibraltar.	Lat. 42°30' N..... 43°38' W. Long. N. Atlantic.	Foundering..... John Rogers.	Total: Ship, \$20,000. Cargo, \$78,000.
May	8.	Lycan..... 134467	5	Liverpool.....	Sail	4,814	London..... Montreal.	Near cape Dog.... St. Lawrence river	Stranding..... Jas. Watt.	Partial.
May	14.	Lahave..... 116742	30	Halifax.....	Steel Steam	60	La Have, N.S..... Halifax.	Off Big Tancook is- land. N. Atlantic.	Stranding..... C. W. Parks.	Total, \$20,000.
June	11.	Lake Houghton... 216051	1	Ecorse, Mich.....	Schr..... Steel	1,378	Sydney..... Boston.	Entrance to Canso harbour.	Stranding..... W. D. Oliver.	Partial.
July	27.	Lake Catherine... 216528	1	Toledo, Ohio.....	Steam	1,193	Cleveland.....	Off Brion island...	Stranding..... R. F. McNabb.	Partial.
Aug.	5.	Lux Blanca..... 135259	5	Toronto.....	Schr..... Steel	3,086	Halifax..... Tampica.	Off Halifax.....	Torpedoed..... John Thomas.	Total.
Aug.	20.	Lucile M. Schnare	1	Lunenburg.....	Schr..... Wood Sail	93-31	Lunenburg..... Fishing grounds.	Off cape Canso...	Bombed by sub- marine. Art. Schnare.	Total: Ship, \$20,000. Cargo, \$17,000.

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STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918—*Continued.*

COASTING AND SEA GOING WRECKS—*Continued.*

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Ton- nage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master	Lives lost.	Loss. Total or Partial.
Aug. 26	Lake Manitoba	17	Liverpool, Eng.	Schr. . . . Steel Steam	6,276	London . . . Montreal.	Montreal harbour.	Burnt Wm. Davidson.		Total.
Sept. 14	Largo Law 124163	12	Glasgow . . .	Steel Steam.	2,533	Montreal	Quebec harbour.	In collision with <i>Sammanger</i> . R. E. Kellett.		Partial.
Sept. 16	Linden. 141370	23	Albany, N.Y.	Wood Steam	708	Erie, Pa. Quebec.	Quebec harbour.	In collision with un- known vessel. H. McKenzie.		Slight damage.
Oct. 10	Leah D . . .	28	St. John, N.B.	Schr. Wood Sail	48	St. John, N.B. Scotch Bay, N.S.	Margaretville, N.S.	Stranding E. Sabean.		Total: Ship, \$1,000. Cargo, \$600. Partial.
Nov. 11	Lake Agomah.		Superior, Wis	Schr. Steel Steam	1,420	Batwood New York.	Louise basin, Que	Collided with gate. H. M. Quinn.		Slight damage.
Dec. 9	Lake Graphite. 217257	1	Wyendotte . . .	Steel Steam	1,617	Quebec.	Quebec harbour.	In collision with <i>Blue Ridge</i> . J. W. McQuaine.		Partial.
Dec. 14	Lake Frampton.	1	Lorain, U.S.A	2 masts. Steel Steam	1,617	Montreal New York.	Cape St. Charles. St. Lawrence river	Stranding W. J. Morgan.		Partial.
Feb. 5	May Queen 59243	49	St. John, N.B.	Wood Steam	340		Lancaster, N.B.	Burnt J. E. Gilchrist.		Total, \$18,000.
June 9	Mary E. McDon- gall.	40	Charlottetown. P.E.I.	Schr. Wood Sail	98	Sydney, N.S. Summerside, P.E.I.	Entrance to Bras D'Or, C.B.	Stranding F. V. Murphy.		Total: Ship, \$2,000. Cargo, \$1,000. Partial.
July 5	Manchester Cor- poration. 108844	19	Manchester	F. & A. Steel Steam	3,478	Manchester Sydney.	Montreal harbour	In collision with <i>Ag- ana</i> . E. W. Biggs.		Partial.
July 10	M. P. Connolly 138796	1	Quebec	Schr. Wood Sail	1,263-99	Three Rivers. Capetown, S.A.	Above Three Rivers	Stranding E. Sabean.		Partial.
July 14	M. P. Connolly 138796	1	Quebec	Schr. Wood Sail	1,263-99	Three Rivers Capetown, S.A.	Off Quebec	In collision with <i>Lake Lansang</i> . S. Irvin.		Partial.

Aug.	3.	Muriel.....	14.	American.....	Schr. Wood Aux.	83	Boston..... Fishing.	45 miles W. by N. from Seal island.	N. Bombed by submarine.	Total, \$15,000.
Aug.	8.	M. P. Connolly. 138796	1	Quebec.	Schr. Wood Sail	1,264	Three Rivers Capetown, S.A.	Sable island.....	E. Nickerson. Stranding..... C. Reiter.	Total.
Nov.	2.	Marie Josephine. 100358	27	Quebec.	Schr. Sail	79.85	Quebec. Manitou, Lab.	River Pentecost. Gulf St. Lawrence	Foundering. J. Caouette.	Total.
Nov.	30.	Mildred. 122314	11	Sydney, N.S.	Wood Schr.	166	Cadix. St. John's, Nfld	.....	Foundering. C. Webber.	Total.
Feb.	5.	Nevada. 95225	28	Montreal.	Schr. Steel	794	Lunenburg. Boston.	C'anso harbour.....	Stranding. J. A. Willett.	Partial.
Mar.	1.	Ninat. 91255	33	Victoria.	Schr. Iron Steam	59.66	Vancouver.... Vancouver.	Stuart island. Haro strait.	In collision with Wakena. J. B. Singleton.	Partial.
May	3.	Nora. 100208	29	Vancouver.	Sloop..... Wood	13.21	Victoria. Genoa bay.	Trail island. Haro strait.	Stranding..... J. Lambert.	Partial.
July	13.	Nellie Louise 111722	17	Bridgetown Bdoes.	Schr. Wood	239.47	Bridgetown..... Halifax.	Hunts point, N.S.	Stranding..... F. A. Hyman.	Partial: Ship, \$15,000. Cargo, \$22,000. Total, \$15,000.
Aug.	4.	Nelson A. 111875	16	Yarmouth, N.S.	Schr. Wood	72.77	Yarmouth, N.S. Yarmouth, N.S.	Off Cape Rosary N. Atlantic.	Bombed by sub- marine. John Simms.	Total.
June	5.	Onward. 103258	23	St. John, N.B.	Schr. Wood	92.05	Parrsboro. Windsor.	Cognogun river N.S.	Stranding..... W. E. Yorke.	Total.
June	30.	Ockenfels. 215126	8	American.....	F. & A.... Steel	3,541	Philadelphia..... Halifax.	Betty's lighthouse. N.S.	Stranding..... John Derry.	Partial.
July	12.	Okio. 131096	5	Shelburne.....	Schr. Wood	41.76	Yarmouth..... Fishing.	Seal island..... N. Atlantic.	Stranding. P. Leblanc.	Partial: Ship, \$3,000. Cargo, \$2,000.
Sept.	6.	Otokio. 130572	7	Lunenburg.....	Schr. Wood	89.46	La Have, N.S. La Have, N.S.	Off Sober island N.S.	Foundering. N. Ritcey.	Total: Ship, \$20,000. Cargo, \$18,000. Total, \$350.
Sept.	—	Olive S. 112378	11	Charlottetown P.E.I.	Schr. Wood Sail	86	.....	Tangier harbour.....	Stranding..... W. D. Cooper.	Total.
Nov.	16.	Owen. 122396	.....	Victoria.	Wood Steam	30	North Vancouver.	Burrard inlet, B.C.	Burnt..... H. Lauder.	Total.
Feb.	9.	Peresian. 117146	26	Quebec.	Schr. Iron	502	Dollerton. Halifax..... Preston, Eng.	N. Atlantic.	Foundering J. E. Bernier.	Total.
April	30.	Prince John. 129472	8	Prince Rupert.....	Schr. Steel Steam	539	Prince Rupert..... Massett Inlet.	McCreight island...	Stranding..... W. S. Morehouse.	Partial.

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COASTING AND SEA GOING WRECKS—*Continued.*

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
May 25	Princess Charlotte 126236	9	Victoria	Schr. Steel	1,999	Vancouver Victoria.	Off Prospect point	In collision with <i>Nanosec.</i> T. O. Griffin.	....	Partial.
June 3	Princess May 109860	30	Vancouver	Schr. Steel	891.74	Granby bay Ocean Falls.	Off Separation point.	In collision with <i>British Columbia.</i> W. J. Boyer.	....	Partial.
June 8	Princess Louise 72682	49	Vancouver	Barge. Wood	381.22	Vancouver Port Alice.	Discovery passage	Stranding H. C. Humphreys.	....	Partial.
Aug. 15	Prince George 129748	8	Newcastle	Steam Schr. Steel	1,625	Seattle, Wash. Ocean Falls.	Johnston strait	Cargo damaged by fire. Dan. Donald.	....	Partial.
Aug. 21	Pasadena 133801	5	Lunenburg	Schr. Wood	91.34	Lunenburg Fishing grounds.	Lat. 44°32' N. Long. 59°50' W. N. Atlantic.	Bombed by submarine. E. Wentzel.	....	Total: Ship, \$18,000. Cargo, \$12,000. Partial.
Aug. 27	Prince George 129748	8	Newcastle	Schr. Steel	1,625	Prince Rupert Vancouver	Lat. 50°24' N. Long. 125°52' W. Pacific ocean.	Stranding Dan. Donald.	....	Total, \$50,000.
Aug. 30	Potentate 138641	1	Lahave, N.S.	Schr. Wood	99.23	Lahave Cape Broyle.	Grand banks, Nfld.	Bombed by submarine. E. Gerardt.	....	Partial.
Sept. 29	Prince John 129472	8	Prince Rupert	Schr. Steel	539	Vancouver Prince Rupert.	Balaclavia island	Stranding N. S. Morehouse.	....	Partial.
Oct. 5	Premier 122444	11	St. John, N.B.	Wood Steam	191	Chipman St. John, N.B.	Off Hampstead, N.B.	In Collision with D. <i>J. Purdy.</i> C. W. McLean.	....	Partial: Ship, \$4,000. Cargo, \$1,500. Partial.
Oct. 13	Princess Adelaide 126948	8	Victoria	Schr. Steel	1,910.25	Victoria Victoria.	Georgina point, gulf of Georgia.	Stranding R. Hunter.	....	Partial.
Oct. 21	Polaris 85759	35	Quebec	Wood Steam	335	Quebec Montreal.	Contrecoeur, St. Lawrence river.	Stranding Thos. Houde.	....	Partial.
Oct. 25	Princess Sophia 130620	6	Victoria	F. & A. Iron	2,320	Vancouver Juneau.	Vanderbilt reef, Lynn canal, Alaska.	Foundering J. L. Locks.	328	Total, \$295,000.

Dec.	9.	Phyllis L. West-haver. 130828	7	Lunenburg.	Schr.	99-34	Lunenburg. Hamilton, Ber.	Island of Bermuda.	Stranding.	Partial, \$2,400.
July	5.	Riviera. 111648	17	Lunenburg.	Schr.	96	Sydney, N.S. Charlottetown, P.E.I.	Governor's island reef, P.E.I.	Stranding.	Partial: Ship, \$200. Cargo, \$200. Partial, \$3,000.
July	11.	Robert G. Cann. 130622	7	Yarmouth.	Schr.	111	Canso, N.S. Yarmouth, N.S.	Near Little Hope, N.S.	Stranding.	Total.
July	14.	Roralli. 202681	13	New York.	Wood Steam.	944	Seattle, Wash. Ketchikan, Al.	Lower inlet, B.C.	Burnt.	Total.
Aug.	3.	Rob Roy.	18	American.	Schr.	77	Boston. Fishing grounds.	35 miles W. of Seal island.	Bombed by sub- marine.	Total, \$14,000.
Oct.	15.	Red Fir. 85674	34	Victoria.	Wood Tug.	45	Victoria. Jordan.	Jordan river.	Stranded.	Total.
Jan.	10.	St. Michael. 124050		Liverpool.	Schr.	2,418	Liverpool. Sydney, N.S.	Sydney harbour.	In collision with <i>Lake Gazra</i> .	Partial, \$3,000.
April	10.	Swan. 122340	11	Vancouver.	Tug.	20	Vancouver. Queen Charlotte.	Forward bay, B.C.	Stranding.	Partial.
May	3.	St. Maurice.	11	Montreal.	Gas	12-82	Grandes Piles. La Tuque.	Near Matawin, St. Maurice river.	Burnt.	Total, \$3,000.
May	—	St. Patrick. 100582	28	Montreal.	Barge	95-58		Head of lake St. Peter.	Jas. Smith. Foundering.	Total.
May	30.	Sarah P. Ayer. 44992	47	Charlottetown, P.E.I.	Wood Sail	64	Tidnish, N.S. Grand Entry.	Grand Entry.	Stranding.	Total, \$3,000.
June	29.	Siberian Prince. 135729	3	Newcastle.	Schr.	3,582	Liverpool. Halifax.	Off Egg island, N.S.	Stranding.	Partial.
July	2.	Sewalls Point. 216101	1	Philadelphia.	Steel Steam	3,373	Baltimore. La Pallice.	Lat. 44°40' N. Long. 63°42' W. N. Atlantic.	Stranding.	Partial.
July	9.	San Jacinto. 200468	15	New York.	Iron Steam	3,870	New York. France.	Lat. 39°50' N. Long. 46°51' W. N. Atlantic	In collision with <i>Osterdeigh</i> .	Partial.
July	25.	Senator Derbyshire. 112351	21	Montreal.	Schr.	986-63	Chicoutimi. Ogdensburg.	Bic island, St. Lawrence river.	Stranding.	Partial.
Aug.	6.	Sicilian. 111225	19	Glasgow.	Wood Steam	5,607	Glasgow. Montreal.	Quebec harbour.	In collision with <i>Canora</i> .	Partial.
Aug.	21.	Sylvania.	8	Gloucester, Mass	Schr.	99	Gloucester. Fishing.	Banquier, North Atlantic.	Sunk by submarine F. Thomas.	Total, \$21,000.

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STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918.

COASTING AND SEA GOING WRECKS—Continued.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Oct. 5	Somali..... 114056	17	Greenock	Steel Steam	4,193	Montreal..... U. K. port.	Quebec harbour....	Damaged by fire G. A. Lamphier.		Partial.
Dec. 9	St. Michel... 137909	1	Toronto.....	2 masts. Steel	1,669-77	Toronto..... New York.	Quebec harbour....	In collision with <i>Blue Ridge</i> . C. Coalfleet.		Partial.
Feb. 16	Tees..... 95929	25	Victoria	Steam Schr.....	441-62	Victoria Victoria.	Lat. 126°19' N. Long. 49°26' W. Pacific ocean.	Stranding J. C. Shaw.		Partial.
April 4	Tees..... 95929	25	Victoria	Steam Schr.....	441-62	Victoria Victoria.	Zero Rock, B.C..	Stranding J. C. Shaw.		Partial.
April 22	The McL. 126440	9	Vancouver.	Steam Wood Gas	10-12	Vancouver. Douglas channel.	Cape Lago, Str. of Georgia.	Stranding W. Kennie.		Partial, \$300.
May 15	Trawler 23			Iron.. Steam			Quebec harbour.	Stranding..... S. A. Hurchison.		Partial.
June 3	T. R. 13.....	1		Steel. Steam	15	Quebec. Halifax.	Near Father point	Stranding..... W. L. McLeod.		Partial.
July 19	Thiepval			Steel Steam			Louise basin, Que	In collision with <i>Long Sault</i> . J. W. Mitchell.		Partial.
Aug. 20	Triumph 125067	11	Halifax	Steel Steam	124	Portland, Me Fishing grounds.	75 miles S.W. of Cranberry head. N. Atlantic.	Shelled by sub- marine. G. Nyhre.	Total: Ship, \$260,000. Cargo, \$2,000. Partial.	
Sept. 15	T. P. Phelan..... 14953	1	Montreal....	Steel Steam Schr.....	768-74	Three Rivers. Montreal.	Isle Hertel, St. Law- rence river.	Stranding... A. F. McLennan.		
Sept. 21	Troja..... 138215	1	Montreal	Steel Steam Schr.....	1,653	Montreal. Sydney.	Off Pointe Citrou- ille, St. Lawrence river.	In collision with <i>Berrima</i> . E. C. Sears.		Partial.
Sept. 28	Troja..... 138215	1	Montreal....	Steel Steam Schr.....	1,653	Montreal Levis.	Levis....	In collision with dock. E. C. Sears.		Partial.

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Oct.	30	Togo Maru 116778	1	Vancouver	Sloop. Wood	23-54	Prince Rupert Vancouver.	Digby island	Stranding L. Nudé.	Slight damage.
	12	Unique 100708	16	Pictou, N.S.	Schr. Gas	5-57	Elizabeth port Halifax.	Tuckermock shoal	Stranding D. McDonald.	Total.
Aug.	7	Unique 103742	9	Lunenburg, N.S.	Schr. Wood	94-74	St. George bay, Nfld Labrador.	Indian tackle, Lab.	Stranding N. Butt.	Total: Ship, \$3,000. Cargo, \$800.
Aug.	20	Uda A. Saunders 126590	8	Lunenburg, N.S.	Schr. Wood	95-38	La Have, N.S. Fishing grounds.	Lat. 44°21' N. N. Atlantic.	Bombed by sub- marine.	Total: Ship, \$13,000. Cargo, \$8,400. Partial.
Jan.	—	V.T.B. 4. 122542	10	Vancouver	Seow. Wood	224-19	Nanaimo, B.C. Prince Rupert.	Egg island, B.C.	In collision with <i>Dola</i> .	Slight damage.
June	10	Valdura 129465	8	Glasgow	Schr. Steel	3,495	Montreal Cardiff.	Montreal harbour	Stranding W. J. Verge. H. B. W. Rennie.	
Aug.	25	Verna D. Adams 138836	1	Lunenburg	Steam Schr.	96-08	Lunenburg Fishing.	25 miles W. ½ S. from Pointe Plate. St. Pierre Mique- lon.	Bombed by sub- marine. R. Mosher.	Total: Ship, \$25,000. Cargo, \$9,000.
Sept.	6	Valmore 117143	1	Halifax	Schr. Wood	11	Lockeport, N.S. Lockeport, N.S.	Lockeport harbour	Foundering (Chs. Conrad.	Total, \$400.
Sept.	9	Verna M. Lohnes.	1	La Have, N.S.	Schr. Wood	99-25	Halifax Antigua, B.W.I.	North Atlantic	Missing C. D. Lohnes.	Total.
Mar.	1	Wakena 208632	7	Seattle, Wash.	Wood Motor	316	Tacoma, Wash. Victoria.	Haro strait, B.C.	In collision with <i>Vitala</i> .	Partial.
May	29	W. B. Sanders	13	American	Steel Steam.	46	Sorel New York.	Caspe, Que.	Foundering J. M. Smith. J. C. McQuaine.	Total.
Aug.	25	Winifredian 110589	17	Liverpool	F. & A Steel	6,812	Avonmouth Montreal.	East of St. Mary's island, Nfld.	Stranding F. Shepherd.	Partial.
Nov.	6	W. F. Gladstone. 107542	20	Yarmouth	Steam Schr.	22-74	Port Maitland Yarmouth.	Briar island, bay of Fundy.	Foundering S. Mussinger.	Total.
Dec.	8	War Matane	1		Wood Sail		Quebec. Halifax.	St. Marguerite is- land, St. Law- rence river.	Stranding R. C. Young.	Slight damage.
Dec.	14	Wilfrid Marcus 134173	3	Shelburne	Wood Steam Schr.	94	Liverpool, N.S. Barbadoes.	Lat. 40°23' N. Long. 43°46' W. N. Atlantic.	Foundering R. Anderson.	Total.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918—*Continued.*

INLAND WATERS WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
July 4	Arabian..... 100394	26	Hamilton.....	Steel Steam	770	Hamilton..... Montreal.	Williamsburg canal	Stranding..... Capt. Hager.	.....	Partial.
Aug. 9	A. McVittie..... 138491	28	Montreal.....	Wood Steam	945	Oswego..... Montreal.	Rock island, St. Lawrence river.	Stranding..... J. A. Ferguson.	.....	Partial loss.
Mar. 12	Bluebell..... 121849	12	Toronto.....	Iron Steam	451	.....	Toronto bay.....	Damaged by fire.....	.....	Partial, \$200.
July 8	Brookdale.....	.....	Montreal.....	Wood Sail	1,161	.....	Welland canal.....	In collision with bridge. A. J. DeRepentigny.	.....	Slight damage.
Aug. 25	Charley Jones... 111860	14	Port Stanley.....	.....	12	.....	Southampton harbour, Ont.	Foundering.....	.....	Total.
Sept. 10	Canadian.....	.....	Goderich, Ont...	Screw. Wood Steam	179-69	Ogdensburg..... Morriston.....	Sisters island, Ont	In collision with W. J. Forest.	.....	Partial.
Nov. 16	City of Ottawa... 122018	48	Ottawa.....	Wood Steam	671	Hamilton..... Montreal.	Bluff point, U.S.A.	Stranding..... Capt. Baxter.	.....	Partial.
April 14	E. H. Bronson.... 103445	23	Ottawa.....	Steel Steam.	179-69	.....	Pembroke..	Damaged by fire. Thos. Draper.	.....	Partial, \$38,000.
June 18	G. H. Warmington 122015	46	Montreal.....	Schr..... Wood Sail	502	Charlotte, N.Y..... Montreal.	Alexandria bay....	Stranding..... H. Latour.	.....	Partial, \$2,000.
Sept. —	George King..... 85313	44	Cleveland.....	Wood Steam	380	Montreal..... Cleveland.	West of Lachine canal.	Stranding..... W. E. Smith.	.....	Partial, \$2,000.
Oct. —	Cale Staples..... 134518	30	Port Arthur.....	Wood Steam	1,293	Buffalo..... Flancock, Mich.	1½ miles W. of Point au Sable light, Mich.	Stranding..... Robt. Graham.	.....	Total.
April 30	Henry B. Hall... 138094	37	Montreal.....	Wood Steam	618-06	Lachine canal... Montreal.	No. 1 Lock Lachine canal.	In collision with gates. A. Patenaude.	Slight damage.

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May	30	H. E. Rennels	25	Buffalo.....	Wood Steam	629	Ashtabula Montreal.	Half mile W. of Car- dinal.	Stranding H. O'Hagan.	Partial, \$600.
Mar.	12	Island Queen..... 117078	13	Toronto.....	Wood Steam	88		Toronto bay.....	Burnt.....	Total, \$10,250.
May	11	James H. Shrigley 131512	37	Sarnia.....	Wood Steam	400	Ashtabula Montreal.	Welland canal.....	In collision with bridge. W. P. Thompson.	Partial, \$5,000.
Mar.	12	Kathleen..... 90574	5	Toronto.....	Wood Steam	72		Toronto bay.....	Burnt.....	Total, \$8,150.
Aug.	11	Kalkasha..... 14429	34	Milwaukee.....	2 spars.... Wood Steam	550	Erie..... Montreal.	Soulanges canal.....	In collision with gates. F. Elliott.	Partial, \$50.
Aug.	13	Kenisha..... 85512	35	Toronto.....	Wood Steam	123-56	Lake Joseph..	Lake Joseph, Mus- koka.	Burnt..... R. W. Lee.	Total, \$12,000.
May	30	Lake Eldon.....		New Cleveland, Ohio.	Schr. Steel Steam	1,457	Cleveland Montreal.	Lake St. Louis.....	Stranding..... F. McDonald.	Partial.
June	6	Lorencia..... 126485	9	Montreal.....	Wood Steam	1,073	Valleyfield Montreal.	Lock No. 3, Sou- langes canal.	In collision with Tres. T. O. Sicotte.	Partial, \$50.
July	3	Lehigh.....	38	Havana.....	Iron Steam	1,035	Montreal..... Cleveland.	West End Soulanges canal.	Stranding..... J. Baast.	Partial, \$1,500.
May	3	Manitoba..... 94879	30	Montreal.....	Steel Steam	1,699	Port McNicoll Collingwood..	Near Collingwood.	Stranding..... J. McIntyre.	Partial.
June	—	Montreal.....	45	Montreal.....	Barge.... Wood Sail	337	Montreal..... Kingston.	Soulanges canal.....	In collision with Wolan. A. Lalonde.	Partial.
Aug.	1	Muriel W..... 138505	32	Montreal.....	Wood Steam	636-80	Quebec..... Quebec.	Lake Erie, Ont.....	Stranding.....	Partial.
Aug.	7	Malton..... 130439	30	Sarnia.....	Compo- site Steam	987	Erie..... Montreal.	Welland canal.....	In collision with bridge. J. A. Smith.	Partial.
Oct.	17	Mary..... 71214	43	Montreal.....	Tug..... Steam	34		Above Point Three Point.	Foundering.....	Partial.
July	25	Overland..... 134520	34	Sarnia.....	Wood Steam	397	Ashtabula Montreal.	Soulanges canal.	In collision with Montreal. R. S. Messier.	Partial, \$1,000.
Sept.	17	Ossifrage..... 107488	32	Chatham.....	Wood Steam	303	Chatham..... Quebec	North side Touseaw's island.	Stranding.....	Partial.
Aug.	17	Pawnee..... 150445	30	Duluth.....	Wood Steam	475	Montreal..... Cleveland.	Welland canal.....	In collision with Montreal. J. Bernstein.	

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1918—*Concluded.*

INLAND WATERS WRECKS—*Concluded.*

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Oct. 27	Pawnee. 150455	30	Duluth.	Wood Steam	475	Oswego. Montreal.	Lock No. 4, Soulanges canal.	In collision with <i>Katharka.</i>		Partial.
Aug. 3	Ralph T. Holcomb. 116400	20	Sarnia	Barge. Wood Steam	164.80	Longueuil. Cardinal.	St. Helen's island	Stranding. John Cherry.		Partial.
Oct. 26	Royalite. 134573	2	Sarnia.	Steel Steam	1,542	Cleveland Montreal.	Lachine canal	In collision with canal banks. Geo. Cross. Damaged by fire.		Partial, \$100.
Jan. 6	Shippewa 100753	25	Toronto	Schr. Steel Steam	763.55		Toronto dock			Partial, \$1,500.
June 11	Salvor. 116395	20	Port Arthur.	Tug.	72		7 miles from South bay, lake Huron.	Foundered.		Total.
Sept. —	Sligo. 72111	44	Toronto	Steam 1 mast. Wood Sail	284.11	Point Anne. Hamilton.	Toronto island, lake Ontario.	Foundered. James Smith.		Total, \$6,000.
Sept. 8	Superior. 202329		Buffalo	Steel Steam	3,845	South Chicago. Port McNicoll.	3 miles outside harbour of Port McNicoll.	Stranding. John Slattery.		Slight damage.
Oct. 12	Senator Derbyshire. 112351	21	Montreal	Wood Steam	968.63	Rochester, N.Y. Chicoutimi.	6 miles above Brockville.	Stranding B. N. Bowen.		Partial, \$3,000.
Mar. 12	Trillium. 126833	8	Toronto	Iron Steam	463		Toronto bay	Damaged by fire		Partial, \$200.
May 8	W. C. Franz 130775	17	Sault Ste. Marie	Schr. Steel Steam	2,030	Superior. Cleveland.	Cleveland	Damaged by fire W. C. Jordan.		Partial, \$8,000.
June 16	Wotan.	25	Manistee, Mich	Wood Steam	712	Ashtabula. Montreal.	Soulanges canal	In collision with <i>Montreal.</i> J. Bernstein.		Partial, \$5,000.

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July	17	Wiley M. Egan.. 111965	32	Montreal.....	Barge..... Wood Steam	1,025	Ashtabula..... Montreal.	Welland canal.....	In collision with bridge. N. Hodgins. Stranding..... W. P. Bennett.	..	Partial.
Oct.	13	War Witch.....			Steel Steam	1,145	Collingwood..... Sandusky.	Nattawasaga bay..		..	Partial.
Nov.	15	Viking..... 161612	29	Duluth.....	Iron Steam	943	Eric, Pa..... Montreal.	Soulanges canal..	Stranding..... A. M. Peterson.	..	Partial, \$2,500.

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MASTERS AND SEAMEN BRANCH.

REPORT OF B. F. BURNETT, SUPERINTENDENT.

During the fiscal year 1918-19, navigation schools were in operation at St. John, Halifax, North Sydney, Yarmouth, Quebec and Kingston. And marine lectures were delivered at Yarmouth, N.S. The total expenditure on account of these services was \$5,120.62.

Examinations for masters and mates certificates were held at Halifax, Yarmouth, North Sydney, Charlottetown, St. John, Quebec, Montreal, Ottawa, Kingston, Toronto, Collingwood, Port Arthur, West Selkirk, Edmonton, Nelson, Prince Rupert, Vancouver and Victoria.

Issued during the year: 13 masters', 15 mates' and 22 second mates' sea-going certificates of competency; 76 masters' and 96 mates' coasting certificates, 44 masters' and 36 mates' inland waters certificates of competency and 40 masters' temporary certificates. Fees paid \$3,372.97. Total expenditure, \$12,921.26.

PILOTAGE.

A regular pilotage service is in operation at forty-one ports in Canada. The total expenditure on account of this service during the fiscal year 1918-19 was \$101,695.30.

SIGNAL STATION, CITADEL, HALIFAX, N.S.

Record of shipping from April 1, 1918, to March 31, 1919, by F. C. Kilburn, Major, R.C.E., Superintendent of Signals:—

Total vessels reported.....	1,824
“ arrived.....	1,821
“ passed.....	3

SABLE ISLAND.

Mr. J. U. Blakeney, superintendent, reports that the repairs recommended in last year's report, have been carried out.

Boats on hand: three life boats, three surf boats, one motor boat, two dories.

Live stock on hand: 36 horses, 55 horned cattle, one pig; received from the mainland during the year three cows, one stud horse, one bull, and one boar.

On December 28 the new pig-house and ten pigs were destroyed by fire.

Total population, 46.

Number of times rounds were made during thick weather: 59, 36 a.m., 23 p.m.

Number of boat drills: 10, rocket drills, 5.

Crops normal.

Wrecks: The four masted schooner *M. P. Connolly* which was stranded on August 5 on Wet bar, eight miles eastward from East light, became a total wreck. Crew were all saved, and a portion of the provisions.

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REPORTS OF AGENCIES.

HALIFAX AGENCY.

During the fiscal year 1918-19 the following aids to navigation were in operation in the agency, 258 lighthouses, 35 pole lights, 14 electric lights, two lightships, *Barrington* and *Halifax*, one explosive fog alarm, 23 diaphones, one Reed trumpet, three steam fog whistles, 57 hand horns, six mechanical fog bells, 24 combined gas and whistling buoys, 11 combined gas and bell buoys, seven gas buoys, 17 automatic whistling buoys, 45 automatic bell buoys, five submarine bells attached to buoys, 192 can and conical buoys, 1,135 spar buoys, and 15 day beacons.

Two humane establishments, one at Sable island and the other at St. Pauls island are maintained by the agency.

Three Government steamers the *Lady Laurier*, *Aranmore* and *Stanley* were employed during the season in the work of the agency.

New aids to navigation were established as follows: one combined gas and whistling buoy moored in position 3.7 miles off Chebucto lighthouse. Halifax approach fairway bell buoy placed in position three cables from "Neverfail" shoal buoy.

Sydney harbour iron conical buoy placed off Edward point, Margaree harbour wooden spar buoy placed at entrance. East Dover two wooden spar buoys.

Repairs have been made at the following light stations: Cape Race, Sydney harbour front, Scattarie, Black rock, Chebucto head, Sheet rock, Isaac harbour, Three Top island, Petit-de-grat, North Canso, McNabs island, and Outique island; a number of lights have been changed and improved.

SYDNEY, N.S., SUB-AGENCY.

Alterations and improvements were made to the Louisburg marine hospital. Arrangements were made for the transportation of the crews of two torpedoed vessels landed in Sydney. A temporary wharfinger was appointed at Port Hastings. Three extra buoys were placed in Glace Bay harbour.

For the year ended March 31, 1919, coastwise arrivals numbered 1,652, tonnage 1,357,253, foreign vessels 552, tonnage 1,228,120, total arrivals 2,204, total tonnage 2,585,373.

PICTOU, N.S., SUB-AGENCY.

Early in May buoys after having been repaired and painted, were placed in position by the steamer *Brant*, in December these were taken up and replaced by winter spar buoys.

Steamers calling at different times were given required assistance.

Steamers arriving 136, tonnage 24,277, steamers departing 135, tonnage 25,406, sailing vessels arriving 430, tonnage 27,282, sailing vessels departing 445, tonnage 28,820.

Navigation opened May 3 and closed December 18.

ST. JOHN AGENCY.

The agency maintained during the year in the bay of Fundy 153 light-stations, 33 of them being range lights, 16 fog alarm plants, one lightship marking the "Lurcher" shoal, equipped with submarine bell, diaphone and modern lighting apparatus and carrying a crew of 16 men, 17 gas and whistling buoys, eight automatic whistling buoys, 28 bell buoys, 69 steel can and conical buoys, and 49 spar buoys.

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In the northern part of the province there were maintained 96 can and conical buoys, three bell buoys, 12 gas buoys, and one gas and bell buoy.

A new concrete tower was erected at cape Spencer, and a new oil pumping outfit installed. A new concrete tower was also built at Coks point, Grand lake.

At Bathurst, bay of Chaleurs, a new wooden pier was built with mast and shed at base for back range light.

The range light towers on lower Fox island, one blown down and the other damaged in a heavy gale, were renewed.

A number of improvements have been made to various other lights and new oil pumping outfits installed.

The Brier island station, bay of Fundy, signalled 79 steamers inward bound and 83 outward bound, 44 schooners inward bound and 51 outward bound; 138 schooners arrived at Brier island harbour and 30 steamers and patrol boats.

The Escuminac, N.B., station, Northumberland straits, reported 28 schooners inward and 31 outward, 10 steamers inward, 6 outward, tugs down the straits 18, up 3 patrol boats down the straits 22, up 2, steamers down the straits 6, up 2.

The Partridge island station, St. John, N.B., signalled 72 steamers, tonnage 229,447, and 30 sailing vessels tonnage 11,008, total tonnage 240,453.

The C.G.S. *Aberdeen* was employed during the year on Agency work.

CHARLOTTETOWN AGENCY.

Repairs to the marine wharf at Charlottetown were continued, part of the East side was built up and planks laid, the part between warehouses Nos. one and four was also repaired; the office was moved further up the wharf.

The agency maintained during the year 53 lightstations, five gas and whistling buoys, four Courtney whistling buoys, and four American pattern bell buoys.

The C.G.S. *Brant* was employed on agency work during the season.

QUEBEC AGENCY.

The district extends from point Platon to Belle Isle, and includes the Saguenay river, Lake St. John and Chaleurs bay, a total coastal service of 2,050 miles.

Vessels under the control of the agency during the season were the ice-breakers *Montcalm* and *Champlain*, the steamers *Druid*, *Eureka* and *Rouville*, the lightships *Red Islet No. 3*, *Prince Shoal No. 7*, *White Island No. 5*, and *Lower Traverse No. 20*; for winter repairs and supplies the icebreaker *Lady Grey* and the steamers *Bellechasse* and *Princess* were employed.

The ferry service between river Ouelle wharf and the north shore of the river St. Lawrence was maintained during the summer and winter months.

New fog-alarm plants were established at Cap Chatte, Ile au Marteau, Little Metis, Perroquet island, Pointe des Monts, and Table head, Anticosti.

New towers were erected at Table head, Anticosti, North point, Anticosti, and part of the new tower was built at Port Daniel West; all buildings were kept in repair and a number of improvements made to different lights.

MONTREAL AGENCY.

New apparatus was installed at Caron point, Dorval, and Pointe Claire light; the buoys in the ship channel were maintained in first class condition. The Dominion steamers *Argenteuil*, *Dollard*, *Reserve*, *Shamrock*, *Vercheres* and *De Levis* were employed during the season in the work of the agency.

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EXPENDITURE.

Agencies, rents and contingencies.....	\$ 16,742 18
Miscellaneous vote 419, 1918-19 (bonus)	1,254 19
War Appropriation, 1918-19 (bonus).....	1,651 61
Construction of lights.....	14,166 99
Construction buoy service.....	953 85
Dominion steamers.....	115,247 19
Maintenance buoy service	85,095 75
Maintenance of lights.....	20,145 34
Lightkeepers' salaries	33,032 54
Maintenance and repairs to wharves....	198 82
	<hr/>
	\$ 288,488.46

DOMINION LIGHTHOUSE DEPOT, PRESCOTT, ONT.

The general work of the depot was somewhat less than last year, but a considerable amount of lighthouse materials was made up and assembled at the various agencies and lighthouses of the department, and all necessary work in connection with the maintenance of lights and the buoy service in the Prescott division was performed. There was a considerable saving of fuel at the depot during winter as compared with former years. The work was somewhat hampered by a lack of skilled machinists.

The machine shop completed about 150 production orders, as well as doing some work on orders not yet completed, the orders included the manufacture of Standard Diamond vapour burner parts, lighthouse stairs, railings, trapdoors, etc., submarine bell buoy parts and diaphone instruments.

The carpenter shop made all necessary repairs to Government steamers, lighthouse and fog alarm buildings, etc., necessary forgings for all apparatus were made in the blacksmith shop; buoy and hoisting gears were overhauled, and a quantity of chain repaired; castings were made in the brass foundry for lighthouse and fog alarm apparatus and also for Government steamers.

As usual in the photometric room tests were made of the various burners, also of petroleum oil and Pintsch gas, and acetylene gas.

The Canadian Government steamers *Grenville*, *Scout* and *Compressia* (the last purchased in October, 1918, a single-screw vessel, 126 feet long, tonnage 320), were employed during the season in the work of the agency.

FORT WILLIAM, ONT., SUB-AGENCY.

The usual work in connection with the lighthouse and supply services and icebreaking was carried on; the Government steamers *Dollard* and *Lambton* were employed in the agency at different times. On April 20 the first vessels left for eastern ports and the last on December 12.

KENORA, ONT., SUB-AGENCY.

Navigation on lake of the Woods in the spring of 1918 did not open until late in May, all lightstations, outbuildings, etc., were kept in repair as usual, and all buoys repaired and painted; a number of these were painted twice owing to the action of the logs rubbing off the paint. The lake of the Woods Milling Company's steamer was used for the replacing of buoys in the lake of the Woods, and Capt. J. W. Short's steamer for work in the White Fish channel.

VICTORIA, B.C., AGENCY.

A reinforced concrete tower is being built at Dryad point replacing the former wooden one, at Nanaimo harbour a new pile beacon was erected on the Middle bank, an electrically operated fog alarm was installed at Ogden point, a new beacon with concrete base was erected on the extremity of Pelly island

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and the submarine cable connected to the new beacon: an automatic fog bell was established at Powell river.

The agency maintained 19 can buoys, 15 conical buoys, 20 platform buoys, 31 spar buoys, and 47 day beacons: 39 buoys are maintained on Fraser and Pitt rivers, 7 spar buoys on Kootenay lakes, and 16 spar buoys on the Arrow lakes.

The C.G.S. steamers *Esteran*, *Newington*, and *Leebro* were employed in the agency during the season.

PRINCE RUPERT, B.C., SUB-AGENCY.

This sub-agency maintained during the season nine lightstations and nine acetylene gas buoys, 16 acetylene gas beacons, five Aga gas beacons, 4 can buoys, 6 conical buoys, 15 spar buoys, 2 platform buoys, and 16 day beacons.

PARRY SOUND, ONT., AGENCY.

No repairs or improvements on a large scale were made to outlying stations or agency plant during the year, and strict economy was exercised. The agency maintained during the season 15 gas buoys, two Trinity Bell iron buoys, one conical can buoy, and 178 spar buoys.

The C.G.S. *Dollard* and the C.G.S. *Lambton* were employed on agency work during the season, and the tug *Primrose* was used on buoy work in the shallow channels between Parry Sound and Penetangueshene.

At the close of navigation the usual work in connection with cleaning, overhauling, and repairing gas buoys, testing lanterns, and preparing spars was carried on.

REPORTS OF HARBOUR COMMISSIONERS.

MONTREAL HARBOUR COMMISSION.

PERSONNEL.

The Board for the year 1918 was, President W. G. Ross, Esq., Commissioners Farquhar Robertson, Esq., and A. E. Labelle, Esq., Secretary-Treasurer M. P. Fennell, Jr., Esq., Chief Engineer F. W. Cowie, Esq., C.E.; other officials Cashier T. F. Trihey, Consulting Engineer Sir John Kennedy, Assistant Chief Engineer T. W. Harvie, Superintendent of Grain Elevators J. Nehin, Mechanical Superintendent George Gendron, Harbour Master Capt. T. Bourassa, Deputy Harbour Master Capt. J. F. Symons, Comptroller George E. Smart, Pay Master and Wharfinger Robert A. Eakin, Superintendent of Railway Terminals J. Vaughan, Assistant Superintendent of Railway Terminals R. L. Mercier, Purchasing Agent L. H. A. Archambault.

TRADE OF MONTREAL COMPARED WITH THAT OF THE LEADING AMERICAN ATLANTIC AND GULF PORTS.

1917

New York—	
Value of imports.....	\$ 1,338,199,355
Value of exports.....	3,053,119,504
	<hr/>
	\$ 4,391,318 859
Port of Montreal—	
Value of imports.....	\$ 214,885,029
Value of exports.....	534,876,677
	<hr/>
	\$ 749,761,706

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TRADE OF MONTREAL COMPARED WITH THAT OF THE LEADING AMERICAN ATLANTIC AND GULF PORTS—*Concluded.*

Philadelphia—		
Value of imports.....	\$	109,485,782
Value of exports.....		464,471,031
	\$	573,956,813
Boston—		
Value of imports.....	\$	217,905,287
Value of exports.....		225,578,485
	\$	443,483,772
Baltimore—		
Value of imports.....	\$	43,972,790
Value of exports.....		374,033,121
	\$	418,005,911
New Orleans—		
Value of imports.....	\$	104,516,862
Value of exports.....		303,510,401
	\$	408,027,263
Galveston—		
Value of imports.....	\$	8,505,116
Value of exports.....		266,279,258
	\$	274,784,374

CHIEF FEATURES OF 1918.

1. The number of transatlantic vessels arriving at the port of Montreal in 1918, viz., 644, was greater than that of any other year in the history of the harbour. The month of October, 1918, established a record. In that month 34 transports and 45 liners cleared from the port, total tonnage 500,000; in October, 1917, 32 liners and 17 transports cleared, total tonnage 208,000.

2. The gross revenue of the port was larger than ever before reached.

3. Larger vessels and greater draft than ever before sailed from Montreal.

4. Heaviest export shipments ever recorded.

5. Large number of merchant vessels flying United States flag sailing from the port of Montreal.

6. Minimum of grain arrived in Montreal by water, maximum by railway.

7. Maximum record of operations of harbour railways, and the success of the Harbour Marginal Railway in connection with industrial development.

8. Minimum of marine accidents in the harbour of Montreal and river St. Lawrence ship channel.

9. Hay-pressing for the United States Government.

10. Extensive handling of heavy packages by the Harbour Commissioners' floating crane.

11. Shipments of fuel oil.

12. Latest closing of navigation on record.

PRESENT CAPACITY OF MONTREAL HARBOUR.

The harbour has eight miles of completed wharfage at this date, capable of accommodating one hundred vessels, as follows:—

For vessels of 500 feet in length, and drawing 30 feet of water.....	28 berths.
For vessels about 400 feet long, with draught of 25 to 30 feet of water.....	36 “
For vessels 300 feet long, with draught of 20 feet of water.....	17 “
For vessels 200 feet long, with draught of 10 feet and over.....	19 “

Eighteen vessels of 1,000 feet long could be berthed in the harbour at one time.

Twenty-one large well-lighted double-storey transit sheds, about 500 feet long by 100 feet wide, are available for goods destined for shipment.

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ENGINEERING DEPARTMENT.

The High Level railway which at the end of last year had been completed to Desmarteau street, Longue Point, has been extended to the lower side of the Imperial Oil Company's wharf at Montreal East, a further length of one and a half miles, completing the final section from Vulcan wharf to Pointe-aux-Trembles, a total length of three miles, linking up these two large industrial plants with the Harbour railway system.

The terminus of the High Level railway now completed is nine miles from McGill street, four miles from Racine wharf, and three miles from Vulcan wharf.

The embankment as far as Vulcan wharf has been built for double track, and the remainder to the Imperial Oil Company's wharf has been made almost wide enough for three tracks. Single track has been laid to Meese street, Longue Pointe, and below that double track to the terminus, except at the crossing at the Canada Cement wharf. A third track has been laid for the full length of this wharf, and a spur connecting it with the wharf front. The embankment measured 270,000 cubic yards composed of rock and clay.

The total amount of track laid was 14,348 linear feet, about two and three-quarter miles. Access to the river at Meese street is by a timber subway of 12 feet span, 10 feet headroom, and at Desmarteau and Hector streets by level crossings with ramps.

Only two of the Commission's dredges were engaged in the harbour at one time, and for part of the season only one, but six of the eight floating derricks were kept fully employed, the deficiency in dredged material being balanced by the unloading of ships ballast and clay excavation. The dredges worked only by day, and were employed chiefly in rock dredging for the Bickerdike pier extension. Dredge No. 3 of the Department of Marine completed the work on the 28-foot channel at the Imperial Oil Company's wharf, Montreal East, begun in 1917.

The Commission's floating crane lightered and handled 18,855 tons during the season, and has proved a valuable adjunct to the port.

Electrical equipment, dredging fleet, transit sheds, grain elevators, engine shops, and sub-stations were maintained and improved.

The wooden wharf of the Dominion Coal Company, Windmill point, for a length of 800 feet and a depth of four courses, was rebuilt, and the Longueuil ferry slip reconstructed for a depth of 11 feet. The Canada Cement Company's wharf at Montreal East was extended by cribwork and refilled at both return ends. On section 42 crib wharfing for a length of 300 feet was rebuilt for a depth of seven feet. The outer end of Sutherland pier for a length of 350 feet and a depth of five feet was rebuilt. Doran wharf at Longue Pointe was generally overhauled.

The life saving equipment was improved by the erection of railings and the distribution of ropes, gaffs, and life preservers at 115 different stations.

The maximum number of workmen employed during the season was 1,101, and the average 915.

RAILWAY TRAFFIC DEPARTMENT.

The extension of the Commission's Marginal railway eastward along the river front has increased industrial activity from Hochelaga to Pointe-aux-Trembles; the following are some of the important industrial developments in this vicinity in recent years:—Asphalt and Supply Co., Ltd., St. Lawrence Sugar Refineries, Ltd., The Canadian Spool Cotton Co., Ltd., Canadian Vickers, Ltd., Canadian Steel Foundries, Ltd., Montreal Locomotive Works, Ltd., The Shell Company of Canada, P. Lyall & Sons Construction Co., Ltd., The National Bridge Company of Canada, Ltd., The Canada Cement Co., Ltd., (Vulcan and Lakefield plants), Imperial Oil Company, Ltd.

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The total mileage of the harbour railway track is now 55.35, an increase of three miles since 1917, and about double the mileage of 1909.

During the season there was an average inward and outward movement of 900 cars per day, and an increase of 25,000 cars handled over the season of 1917. The total number of cars handled by the Commission during the year was 247,009 as against 215,394 for 1917.

GRAIN ELEVATOR SYSTEM.

Prior to the war 75 per cent of the grain arriving in Montreal was transported by water, and 25 per cent by rail, in 1918 only 12 per cent was carried by water, and the remaining 88 per cent by rail.

The capacity of the Commission's Elevator system is as follows: Elevator No. 1, 4,000,000 bushels; Elevator No. 2, 2,662,000 bushels, and of the Grand Trunk elevators, 2,150,000 bushels.

The total quantity of grain handled by the Commission's elevators Nos. 1 and 2 during 1918 was 45,520,688 bushels as compared with 42,831,504 bushels for 1917.

POLICE DEPARTMENT.

The Harbour Police Force in 1918 comprised five officers and 84 men, all uniformed and armed, who regulated the traffic, maintained order, and protected life and property within the harbour limits. No accidents of even a minor nature occurred during the season in the area under their care. During the season 215 persons were arrested and brought before magistrates and recorders for different offences.

FINANCIAL STATEMENT.

Receipts on Revenue Account amounted to \$2,104,191.48, an increase of \$253,554.55 over the previous year. Cost of operations, maintenance, interest, etc., was \$2,026,542.07, leaving a balance to the credit of the Revenue Account of \$77,649.61. Interest charges amounted to \$903,585.17, an increase of \$10,833.32 on new loans due to carrying out improvement works.

From the Dominion Government loans of \$380,000 on capital expenditure, and \$300,000 to retire public debentures maturing on July 5th, were received.

The disbursements on capital account for 1918 were \$271,239.31.

GENERAL.

A plan has been developed for the building of an absolutely up to date warehouse and coal storage plant for the port of Montreal similar to those already in operation in Boston and New York; this proposed plant will have the advantages of a site on the harbour front, railway and trucking facilities, electric power, economical handling facilities, required temperatures, and special stores for provisioning ships.

The structure will be divided into two parts, 1—Cold Storage 256 feet by 108 feet by 105 feet. 2—Dry Storage 166 feet by 110 feet by 105 feet, total cubic contents 4,751,040 feet, the estimated cost of the structure is \$1,400,000.

As this warehouse will be directly connected with rail and ship, handling charges will be reduced and required temperatures will be secured for the proper protection of perishable goods awaiting transportation; the erection of this plant will be of special advantage to the beef and bacon, and dairying industries.

In 1914 a scheme for the electrification of the steam operated harbour railway of the Commission was considered, and the Commissioners paid visits to electrified freight terminals in New York and Philadelphia, with a view to adopting a similar system for the port of Montreal; during the war the plan

was temporarily abandoned, owing, however, to the increased economy and safety of electrically operated roads it has now been revived, and the Commission has consulted the electrical experts of railways with terminals in Montreal with a view to affecting an additional improvement in the harbour of Montreal by substituting electricity for steam in the present Harbour Railway system.

QUEBEC HARBOUR COMMISSION.

CHIEF ENGINEER'S REPORT.

As a large area at the west end of the embankment between the old and the new St. Charles river quay walls was under rental to the Quebec Shipbuilding and Repair Company, for use as a shipyard, the work of grading and paving had to be suspended, and can only be resumed when the site under lease reverts to the Commission.

The first of the two fireproof landing sheds, 1,000 feet by 104 feet, on the St. Charles river quay front, with the grain galleries was taken over from the contractor last season. A railway line was laid along the shore side of this shed and an additional Gantry locomotive crane provided for use along the dock front.

The structural steel work of the second of these landing sheds, 775 feet by 75 feet, and dock front grain gallery is now about completed.

A grain bagging shed was built at the west end of the new annex to the elevator, and a temporary wooden office building placed near the elevator for the accommodation of the staff.

Quarrying operations at the Victoria Cove quarry have been discontinued, and the remaining plant removed.

The river end of the long wharf at Indian cove for seven feet down from coping level, and for a length of 131 feet has been rebuilt and filled with wharf stone, giving a length of 300 feet. The saw mill on this wharf has been dismantled.

On the nights of November 18 and 19 high tides with a strong east wind caused considerable damage to the Commissioners' property at Pier No. 1, Pointe-a-Carey pier, and Indian cove long pier; the highest of these tides on the evening of November 19 rose to 23 feet two inches above the Commissioners' low-water mark, and five feet two inches above the normal level of spring tides.

WHARFINGER'S REPORT.

The traffic in connection with the St. Charles docks and wharves was: inward 424 vessels, 461,170 tons register; outward 266 vessels, 594,979 tons register; lower port steamers 61, 19,481 tons register.

HARBOUR MASTER'S REPORT.

Port of Quebec—Record of shipping arrivals, 1918:—

	Number of vessels.	Gross tonnage.
Coasting vessels from seaward.....	128	129,550
Coasting vessels from Montreal and lake boats.....	361	619,391
Ocean Steamships inward	153	1,150,147
Ocean Steamships outward from Montreal.....	115	865,761
	757	2,764,849

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The unusual large amount of tonnage from Montreal is due to government shipments.

As compared with the returns for 1917 there is an increase of 76 ships, and 599,975 tons.

Vessels built at Quebec in 1918 were *War Mohawk*, launched May 11, ferry *Conora* launched June 10, *War Seneca* launched June 13, *War Quebec* launched June 28, *War Gaspe* launched July 27, *War Sorel* launched September 7, *War Matane* launched September 23, schooner *Edgewood* launched November 4.

REVENUE AND EXPENDITURE.

The revenue for 1918 was \$437,496.31, an increase of \$169,688.63 as compared with 1917, the total expenditure was \$418,252.04, leaving a surplus for the year of \$19,244.27.

TRAFFIC MANAGER'S REPORT.

During the course of the year 52,311 cars were handled by the Commissioners' locomotives as against 43,590 in 1917, an increase of 8,721 cars.

PRESENT EQUIPMENT OF THE PORT OF QUEBEC.

The port of Quebec is spacious, deep, and well protected, it has modern landing sheds containing 523,000 square feet of floor area, deep water berths at low tide for 22 vessels drawing 40 feet, 53-ton floating crane, Gantry dock cranes and locomotive cranes available at all times for handling cargoes, a grain elevator with a capacity of 250,000 bushels, a fireproof concrete grain elevator with a capacity of 2,000,000 bushels with grain galleries and conveyors, and grain drier, Richardson separator, and bagging shed, two graving docks, one 600 feet by 62 feet wide at the entrance, and one (new) 1,150 feet by 120 feet wide at the entrance, capable of taking the largest vessels, and with repair shops attached; the port can accommodate vessels of large draught for a period of eight consecutive months.

THREE RIVERS HARBOUR COMMISSION.

The receipts from harbour dues amounted to \$10,272.22, while the expenditures were \$17,113.65, leaving a deficit of \$6,841.43. The harbour during the year was visited by one seagoing vessel only, the barge *Conolly*, afterwards lost off the coast of Newfoundland; the commercial fleet depleted by the war has evidently confined itself to visiting commercial centres. Shipbuilding, however, foundries, and business firms have been greatly extended.

Raw material instead of being brought in through the natural and cheapest channel, the river, came by rail, for the same reason exportation was not carried out to the fullest extent.

STATEMENT of number and tonnage of steamers and other vessels reported inward and outward of the port of Three Rivers for the year 1918.

OCEAN TRAFFIC—Return of Vessels Inward.			OCEAN TRAFFIC—Return of Vessels Outward.		
Nationality.	No.	Tons.	Cleared for	No.	Tons.
British.....	1	1,263	Africa, Cape Town.....	1	1,263
United States Traffic.			Inland traffic.		
Canal boats	245	39,255	Schooners and barges.....	92	14,252
			Tugs and Steamboats.....	577	822,825
				669	837,077

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RECAPITULATION

	No.	Tons.
Ocean traffic.....	1	1,263
United States traffic.....	245	39,255
Inland traffic.....	669	837,077
Grand Total.....	915	877,595

MERCHANDISE.

Inward.		Outward.	
Hard coal.....	6,775 tons.	Sand,.....	15,000 tons.
Soft coal.....	26,793 "	Lumber.....	1,920,547 feet.
Sand.....	2,876 "	Pulpwood.....	9,967 cords.
Paper.....	983 "	Paper.....	1,181 tons.
Cordwood.....	731 cords.		
Sulphur.....	1,219 tons.		
Pulp.....	738 "		
Timber.....	522,754 feet.		
Bricks.....	1,420,000 "		
Apples.....	2,250 bush.		

RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1918.

Receipts.		Disbursements.	
Tonnage dues.....	\$ 1,518 58	Current expenses.....	\$ 334 19
Harbour dues: inward.....	3,275 57	Salaries and commissions.....	4,601 15
Harbour dues: outward.....	1,142 91	Printing and stationery.....	41 55
Rent of wharves and moorage.....	2,743 31	Travelling.....	108 87
Commutation, divers, and discounts.....	28,829 35	Repairs and general harbour expenses	1,5 60
		Interest on debentures.....	9,525 00
		Construction.....	821 22
		Divers, repayments, &c.,.....	20,433 22
Total receipts.....	\$ 37,509 72	Total expenses on revenue.....	\$ 37,426 15
Balance on December 31, 1917.....	1,155 15	Deposits in bank, and cash on hand,	
		December 31, 1918.....	1,238 72
	\$ 38,664 87		\$ 38,664 87

PICTOU HARBOUR COMMISSIONERS' REPORT.

STATEMENT of Harbour Dues for the year ended December 31, 1918.

Balance on hand December 31, 1917.....	\$ 100 00
Collections of harbour dues for year 1918.....	351 38
	\$ 451 38
Disbursements for 1918:—	
Paid salary of harbour master.....	\$ 200 00
Paid salary of harbour commissioners.....	151 38
Balance on hand, December 31, 1918.....	100 00
	\$ 451 38

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Pictou Harbour Commissioners' Account for year ended December 31, 1918:

			\$	cts.
1918.				
March 19	To paid	Geo. McRay saving buoy and taking it to Pictou.....	5	00
Apr. 13	"	H. B. Ross, Secy.....	50	00
May 8	"	E. C. McDonald, bushing East river.....	26	00
	"	Wm. McLean, bushing harbour.....	18	00
" 29	"	"Hiawatha" putting out buoys.....	30	00
	"	P. Hall, painting buoys.....	10	00
	"	E. C. McDonald, balance for bushing East river.....	13	50
Oct. 28	"	H. B. Ross.....	50	00
	"	Chain for buoy.....	10	80
Dec. 6	"	S.S. "Hiawatha," taking in buoys.....	30	00
	"	R. Powell, extra bushing East river.....	15	00
	"	R. Chapman, repairs to buoys.....	7	50
		Balance.....	\$	346 39
				<u>\$ 612,19</u>
1917.				
Dec. 31	By balance.....		\$	460 81
1918.				
Feb. 14	By Harbour dues for 1918 from Coll. of Customs.....		151	38
				<u>\$ 612 19</u>
	By Balance.....		\$	<u>346 39</u>

REPORT OF BELLEVILLE HARBOUR COMMISSIONERS.

HARBOUR MASTER'S REPORT.

		IMPORTS.	
23,308 tons of coal at 10c.....		\$2,330	80
279 " of merchandise.....		27	90
208,466 gals. molasses at 50c per 1000.....		104	23
Rental of warehouse and dock.....		1,195	00
			<u>\$ 3,657 93</u>
		EXPORTS.	
1,478 tons cheese at 10c		\$	147 80
274 " merchandise at 10c.....		27	40
			<u>175 20</u>
			<u>\$ 3,833 13</u>
Disbursements, sundry expenses.....			190 70
Balance.....			<u>\$ 3,642 43</u>
1918.			
Jan. 21	To balance on deposit.....	\$	331 09
June 25	" Harbour dues.....		291 80
July 23	" " ".....		513 65
Aug. 20	" " ".....		459 10
Dec. 23	" " ".....		362 40
Oct. 24	" " ".....		293 53
Nov. 21	" " ".....		516 85
" 23	" Warehouse rental.....		750 00
Dec. 9	" Harbour dues.....		155 10
" 21	" Warehouse rental.....		150 00
Jan. 18	" " ".....		150 00
			<u>\$ 3,973 52</u>
1918			
March 23	By auditor's fees.....	\$	5 00
" 23	" secretary's fees.....		50 00
May 23	" telephoning.....		1 25
Oct. 2	" interest on debentures.....		600 00
" 17	" postage.....		2 50
Nov. 20	" legal advice.....		3 50
Dec. 3	" transfer to sinking fund.....		2,000 00
" 30	" repairs to harbour wharves.....		147 18
" 30	" harbour master (11 months).....		550 00
Jan. 18	" balance in bank.....		614,09
			<u>\$ 3,973 52</u>
			<u>\$ 3,973 52</u>

STATEMENT of Sinking Fund to December 31, 1918:—

	To credit of fund Dec. 31, 1917, as per statement rendered.....	\$ 7,436 93
Dec.	4 Deposit from current account	2,000 00
"	31, Interest to date.....	224 74
	Total of Fund.....	\$ 9,661 67

VANCOUVER HARBOUR COMMISSION.

The period covered by this report is for the nine months from April 1st to December 31st, 1918; it is now made out for the calendar year instead of the fiscal year as formerly.

SHIPBUILDING.

During 1917-18 Coughlan & Sons, Limited, completed six steel steamers of 8,800 tons each, and the firm has under contract four more ships of the same tonnage as well as four of 8,100 tons each, for the Dominion Government. Wallace Shipyards, Limited, completed three steel steamers of 4,800 tons each, and have two more of the same tonnage, and two of 5,100 tons on the ways; other yards have built twelve wooden steamers of 2,800 tons each, thirteen of 1,500 tons, and six auxiliary schooners. A measured mile had been marked off by the Commission on Spanish banks for testing the speed of new ships.

GRANVILLE ISLAND.

The industrial area reclaimed by the commission has been laid out into 79 lots of which 49 are at present occupied, and of the remainder a number are at present under consideration by industrial firms, among other companies using this site are the Vulcan Iron Works, and the Wallace Foundry, Limited, subsidiary to the Wallace Shipyards.

SHIPPING RETURNS.

	Vessels.	Tonnage.
Coastwise, inward.....	9,882	3,413,790
" outward.....	10,199	3,853,161
Foreign, inward.....	1,432	1,759,073
" outward.....	1,377	1,443,306
	22,890	10,469,330

In 1917 the number of vessels was 23,017, tonnage 10,639,507.

GOVERNMENT WHARF.

During the nine months covered by the report 71 vessels berthed at the wharf, the volume of business amounted to 74,100 tons of freight and 4,082,817 feet of lumber B.M. The total revenue amounted to \$25,375.71, the operating expenses were \$9,091.30, leaving a surplus of \$16,284.41. The completion of the new warehouse 843 feet by 98 feet was of assistance to the salmon packing industry. In the autumn of 1918, 200,000 cases of canned salmon were stored in the warehouse for shipment.

RECEIPTS AND EXPENDITURES.

Total operating receipts \$72,811.15, total operating expenditures \$49,586.10, surplus for nine months ended December 31, 1918, \$23,225.05.

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HARBOUR DEVELOPMENT.

In December, 1918, Mr. A. B. Swan, M.S.C.E., was instructed by the Government to make a report on harbour development; after making an exhaustive study of the harbour and interviewing leading representatives of shipping and commerce, Mr. Swan made a report which, when carried out, will enable the port to adequately safeguard Canadian commercial interests on the Pacific.

PORT WARDENS' REPORTS FOR THE YEAR ENDED DECEMBER 31, 1918.

Returns have been received from sixteen port wardens, eight from Nova Scotia, two from New Brunswick, two from Quebec, and four from British Columbia.

The total amount of fees collected by port wardens was \$39,408.48.

The number of foreign-going ships reported at the port of Montreal was 518, total tonnage 1,819,884, an increase of eight vessels over last year, and a decrease of 31,158 tons; from the lower ports 14 steamers, tonnage 15,410, and eight sailing vessels, tonnage 680 entered, total 160 vessels, 16,090 tons, a decrease of 38 vessels and 28,168 tons as compared with 1917.

The amount of grain shipped was wheat 21,303,414 bushels, peas 27,038 bushels, barley 2,741,595 bushels, oats 35,153,871 bushels, rye 206,012 bushels, total shipments of grain 59,431,930 bushels, an increase of 305,172 bushels over the shipments for 1917.

At the port of Montreal navigation opened on April 20th, and closed on December 14th.

Casualties during the year between Montreal and Father Point were: SS. *Lycaon* stranded May 8th off cape Dogs, repaired temporarily at Canadian Vickers, Limited, in Montreal, and proceeded to New York; SS. *Celtic Prince* stranded on Barnaby island July 8, permanently repaired at Quebec and cleared for Hull, Eng., on November 28; SS. *Lake Manitoba*, caught fire when loading fuel oil at Imperial Oil Company's wharf on August 26, completely gutted.

The only other serious casualty reported by any of the port wardens was the stranding of the SS. *Corinthian* on December 15, on Batsons ledge, four miles N.W. of Briar island, part of cargo salvaged. This casualty was reported by the Westport, N.S., port warden.

During 1918 there was a marked increase in the exports of fuel oil from the port of Montreal, 145 vessels having loaded 63,665,000 gallons, as against 72 vessels and 16,794,083 gallons for 1917, an increase of 73 vessels and 46,870,917 gallons.

Canadian Vickers, Limited, launched during the year the following ocean steamers:—

Name of Ship.	Tonnage Deadweight.	Date of Launching.
War Earl.....	7,200	8th June.
War Duchess.....	7,200	2nd July.
Sammanger.....	7,200	3rd August.
War Faith.....	7,200	28th September.
War Joy.....	7,200	29th October.
Canadian Voyageur.....	4,350	23rd November.
Canadian Pioneer.....	8,100	3rd December.

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REPORT OF THE QUEBEC SALVAGE AND WRECKING COMPANY.

Assistance was rendered to vessels as follows:—

1918.

May 8 to 12.—British steamer *Lycaon* ashore near cape Dog, salved and brought to Montreal.

May 13 to 26.—SS. *Lake Como* (American) ashore between Godbout and Pointe-des-Monts, among boulders, boulders blasted and ship salved and brought to Buffalo.

June 16 to July 3.—Went to assistance of British steamer *Ascania* stranded 32 miles to the east of cape Ray; a gale springing up with heavy sea prevented salving; steamer became a total wreck.

July 8 to 14.—British steamer *Celtic Prince* ashore on Barnaby island, salved and brought to dry dock, Montreal.

August 28 to September 26.—Went to assistance of British steamer *Winnifredian* ashore at St. Marys island, with assistance of anchor and SS. *Lord Strathcona* floated her and towed her to Quebec and then to dry dock, Montreal.

October 12.—H.M.S. *Kildonan Castle* struck bottom on her way from Father Point to Quebec, bottom examined and declaration given before notary public enabling her to proceed.

October 4 to 13.—Wooden drifter No. 57 ashore off cape Gaspe, attempt to float her failed owing to falling tide and intricate position of ship.

October 29 to November 25.—Towed British steamer *Lake Manitoba* in a damaged condition from Quebec to Halifax.

December 3 to 9.—New Canadian steamer *Canadian Pioneer* towed in an unfinished condition from Montreal to Quebec.

The SS. *Lord Strathcona* and the schooner *G.T.D.* properly manned, with salving gear in good order, were kept in commission all season.

RETURNS OF SHIPPING MASTERS FOR THE YEAR ENDING DECEMBER 31, 1918.

NOTE.—The collector of Customs acts as shipping master where no other shipping master is appointed.

Province.	Seamen Shipped.	Seamen Discharged	Amount.
			\$ cts.
Quebec.....	4,313	2,132	3,204 85
New Brunswick.....	857	429	561 70
Nova Scotia.....	5,548	4,757	4,354 60
Prince Edward Island.....	120	60	77 10
British Columbia.....	5,678	5,552	4,504 60
Total.....	16,516	12,930	12,702 85

EXPENDITURE AND REVENUE.

The parliamentary appropriation for the fiscal year 1918-19 was \$5,432,-064.55, the expenditure \$4,459,165.45, leaving an unexpended balance of \$972,899.10. The net revenue was \$397,012.79.

CORRESPONDENCE.

The number of letters received during the fiscal year 1918-19 was 66,601 as against 57,562 in 1917-18, an increase of 9,039 or about 16 per cent.

The number of letters sent out was 39,116 as against 33,229 in 1917-18, an increase of 5,887 or about 17 per cent.

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This increase is chiefly due to correspondence relating to the new Canadian shipbuilding programme, the control of shipping during the war, and the new system of making appointments to the outside service through the Civil Service Commission.

Advertisements to the number of 207 were issued inviting applications for vacancies in the department, 52 of which were sent from the records branch.

SEASON OF NAVIGATION.

At the port of Montreal navigation opened on April 20, 1918, a week earlier than in 1917, and closed on December 14, 1918, a week later than in 1917.

NEW LEGISLATION.

During the parliamentary session of 1918-19 the following new legislation affecting the department was enacted:—

1. Section 432 of the *Canada Shipping Act*, Revised Statutes of Canada, 1906, Chapter 113, a portion of the Act respecting Pilotage is repealed and the following is substituted therefor:—

“432. Notwithstanding anything in this Part, the Governor in Council may, when it appears to him to be in the interest of navigation, appoint the Minister to be the pilotage authority for any pilotage district or for any part thereof; and the said Minister shall thereupon supersede the then existing pilotage authority for that district or part of a district: Provided that nothing in this Part shall authorize the Minister to sit as a tribunal for the trial of offences of which pilots may be accused before the pilotage authority; but such Minister may, in any case not provided for by Part X of this Act, designate a tribunal or officer to try any such offence.”

2. Paragraph (h) of section 862 of the said Act, relating to harbour masters' fees, is repealed, and the following paragraphs are added at the end of the said section:

“(h) for every ship over seven hundred tons and not over one thousand tons register, five dollars;

“(i) for every ship over one thousand tons register, seven dollars.”

3. Section 865 of the said Act relating to harbour masters' salaries is repealed and the following is substituted therefor:—

“865. The salary or remuneration of each harbour master shall from time to time be fixed by the Governor in Council, but shall not exceed the rate of one thousand two hundred dollars per annum, and shall be subject to the conditions hereinafter contained.”

An Act transferring certain rights and powers in and over the harbour of St. John formerly vested in the Corporation in the City of St. John to a Board of three Commissioners appointed by the Governor in Council; this Act is termed “The St. John Harbour Commissioners' Act.”

An Act to provide for a loan not exceeding five million dollars to the Vancouver Harbour Commissioners termed “The Vancouver Harbour Advances Act, 1919.”

An Act fixing the rate of interest to be paid on loans by His Majesty to the Harbour Commissioners of Montreal and Quebec at five per cent after April 1, 1919.

An Act to amend the Canada Shipping Act (Transfers and Mortgages of Ships).

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1. (1) A transfer, or a mortgage or a transfer of a mortgage of a British ship registered in Canada to a person not qualified to own a British ship, or to a foreign controlled company, shall not have any effect unless the same is approved by the Minister of Marine and Fisheries on behalf of His Majesty.

(2) Any person who makes or purports to make such a transfer, mortgage or transfer of mortgage without this approval shall, in respect of each offence, incur a penalty of a fine not exceeding five thousand dollars or imprisonment for any term not exceeding five years, or both fine and imprisonment, and such penalty may be imposed either upon summary conviction or upon indictment.

(3) The expression "foreign controlled company" means any corporation,—

(a) where the majority of the directors or persons occupying the position of directors by whatever name called, are not British subjects; or,

(b) where the majority of the voting power is in the hands of persons who are not British subjects, or who exercise their voting powers directly or indirectly on behalf of persons who are not British subjects; or,

(c) where the control is by any other means whatever in the hands of persons who are not British subjects; or,

(d) where the executive is a foreign controlled company, or where the majority of the executive are appointed by a foreign controlled company.

A corporation shall not be deemed to be a British subject for the purpose of this section unless it is established in and subject to the laws of some part of His Majesty's Dominions, or of some British Protectorate, and has its principal place of business therein.

(4) The said Minister may require any person who is the owner or mortgagee of a British ship registered in Canada, or who applies to be registered as the owner or mortgagee of a British ship registered in Canada, to furnish to him such particulars as appear necessary to him for the purpose of ascertaining whether or not that person is, or is a trustee for, or otherwise represents, a foreign controlled company, and, in the case of a corporation, may also require the secretary, or any other officer of the corporation performing the duties of secretary, to furnish those particulars.

If any person fails to supply such particulars as it is in his power to give when required, or furnishes particulars which are false in any material particular, he shall be guilty of an offence and shall incur a penalty of a fine not exceeding five thousand dollars or imprisonment for any term not exceeding five years, or both fine and imprisonment, and such penalty may be imposed either upon summary conviction or upon indictment.

2. Where, after the passing of this Act, any person who is the owner or mortgagee of a British ship registered in Canada ceases to be a British subject or becomes a foreign controlled company, that ship, or, in the case of a mortgagee of a ship, the interest of the mortgagee, shall be subject to forfeiture under Part 1 of the Merchant Shipping Act, 1894.

3. In this Act, unless the context otherwise required any reference to a ship shall include a reference to a share in a ship.

4. This Act shall continue in operation for three years.

An Act to amend the Act respecting the appointment of a Harbour Master at the Port of Halifax.

1. Section two of chapter seventy-eight of the statutes of 1885, entitled An Act to amend the Acts respecting the appointment of a Harbour Master of the Port of Halifax, is repealed, and the following is substituted therefor:—

"2. The Harbour Master of the port of Halifax may, out of the moneys received by him for fees, retain for his own remuneration such sum, not exceeding three thousand dollars per annum, as the Governor in Council may authorize;

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and if the moneys received by him for fees in any calendar year amount to a less sum than that allowed by him to the Governor in Council, then such sum shall be his remuneration for that year."

2. Section seven of chapter forty-nine of the statutes of 1882, entitled An Act to amend the Act thirty-fifth Victoria, chapter forty-two, respecting the appointment of a Harbour Master for the Port of Halifax, is repealed and the following is substituted therefor:—

"7. (1) The Harbour Master for the port of Halifax shall be remunerated for his service solely by the fees, or the portion hereinafter mentioned of the fees, which he may from time to time be authorized, by the rules and regulations to be made as hereinbefore provided for, to collect, in respect of all ships over twenty tons register, entering the port of Halifax, but which shall not at any time exceed the following rates, that is to say:—

"(a) For every ship over twenty tons and not over fifty tons register, fifty cents;

"(b) For every ship over fifty tons and not over one hundred tons register, one dollar;

"(c) For every ship over one hundred tons and not over two hundred tons register, one dollar and fifty cents;

"(d) For every ship over two hundred tons and not over three hundred tons register, two dollars;

"(e) For every ship over three hundred tons and not over four hundred tons register, two dollars and fifty cents;

"(f) For every ship over four hundred tons and not over five hundred tons register, three dollars;

"(g) For every ship over five hundred tons and not over seven hundred tons register, four dollars;

"(h) For every ship over seven hundred tons and not over one thousand tons register, five dollars;

"(i) For every ship over one thousand tons register, seven dollars".

"(2) Ships of twenty tons register and under shall not be subject to any duty under this Act, nor ships engaged in trading or plying between ports and places in the Dominion of Canada."

In accordance with Section 854, Part XII, of the Canada Shipping Act, relating to Public Harbours and Harbour Masters, a number of By-Laws have been framed respecting the loading and handling of explosives in harbours.

STEAMBOAT INSPECTION.

The report of the Chairman of the Board of Steamboat Inspection is published as a supplement to the annual report.

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.

